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ECONOMIC IMPACT OF A PROPOSED MANDATORY DEPOSIT ON BEER & SOFT DRINK CONTAINERS IN CALIFORNIA.

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THE ECONOMIC IMPACT OF A PROPOSED MANDATORY DEPOSIT ON BEER AND SOFT DRINK CONTAINERS IN CALIFORNIA

An Analysis of Assembly Bill 594 of the 1973-74 Session

October 1975

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CHAPTER I

INTRODUCTION AND SUMMARY OF FINDINGS AND CONCLUSIONS

Introduction

This report was prepared pursuant to House Resolution 115, 1973-74 Regular Session, which directed the Legislative Analyst to evaluate the economic impact of Assembly Bill 594, (Dixon) of the same session. The intent of this bill was to reduce litter through controls on the use of beverage containers in California. The bill would have prohibited the use of cans with detachable (i.e., "flip-top") openings for beer and carbonated beverages and would have also imposed a minimum five-cent deposit on all beer and carbonated beverages sold in the state. The bill was similar, but not identical, to Oregon's Minimum Deposit Law.

Initial legislative hearings on the bill elicited considerable testimony regarding the economic implications for the beverage and beverage container industries. No specific estimates were presented, however, and conflicting opinions were expressed as to the potential magnitude of the economic impact. Accordingly, our office was directed to conduct this study.

This analysis attempts to identify the major areas of potential changes in those sectors of the economy that would be affected, and to develop approximations of the magnitudes of these changes. House Resolution 115 did not direct us to evaluate the effectiveness of the bill in controlling litter, nor does our study address the policy issue of the environmental or social desirability of this type of legislation.

Scope of the Study

After an exhaustive review of existing studies and literature on the effects of similar legislation, both actual and potential, and a survey of available industry data, we concluded that our study would focus on those industries directly involved in the production, distribution and retailing of soft drinks and malt beverages, and the manufacturing of glass and metal beverage containers. We fully recognize that other industries would be affected, in particular, the suppliers of raw materials to these primary industries, as well as their suppliers in turn. We concluded, however, that the major impact of any changes in beverage consumption or container usage would be on the primary industries and that data limitations and problems of estimation indicated that it would not be feasible to extend the analysis further.

The first phase of our analysis is an evaluation of the potential effect of AB 594 on the output of the beverage and container industries. Estimates were made of the range of potential reduction in consumer demand for beer and soft drinks that would be induced by the mandatory deposit, and the additional impact on the market share of cans, one-way bottles, and returnable bottles in each beverage market. The second phase of the analysis is the translation of these estimates into projections of changes in sales volume, employment, payrolls, profits and new investment in each affected industry.

Organization of the Report

The balance of this chapter contains an explanation of our data collection procedures, an outline of the estimating methodology, and a summary of our results. The key assumptions underlying these estimates are also set forth. Chapter II reviews the available reports and studies on the impact of similar regulation of beverage containers, both proposed and enacted, on the national level and for other states. The chapter briefly summarizes the conclusion of two major national studies, and a study conducted for the State of New York. A comprehensive review of the results of the Oregon "bottle law" is included in this chapter. Chapter III contains detailed analyses of each industry affected by changes in beverage consumption patterns, including a description of the characteristics of the industry and a more detailed presentation of our findings. This chapter also sets forth the source or derivation of the key factors used in developing the estimates in each industry. Chapter IV discusses the potential economic impact of AB 594 from the standpoint of litter collection and disposal. Appendices provide supplementary data and all detailed calculations.

Data Collection Procedures

We initially began our data collection efforts by requesting from each industry, through the State Chamber of Commerce, detailed data on unit sales values, fixed and variable production costs, profit margins, employment, and capital investment for each product line within the industry. We further requested that each industry submit its own estimates of the impact on its operations of the proposed legislation. Primarily because of problems of confidentiality, the response to this initial request was generally not adequate for the analytical techniques we had planned to use in our study. Subsequently, we contacted representatives of each industry to discuss our data requirements and attempt to resolve the disclosure problems that industry representatives felt would be created by complying with our request. Extensive discussions at the industry level and with individual companies failed to resolve all of these problems and the data ultimately made available to us varied significantly from industry to industry in terms of the detail and format we had requested. The extent to which each industry was able to comply with our request is discussed in subsequent chapters. In the aggregate, the data obtained was not, in our opinion, adequate for a complete and comprehensive analysis and evaluation of the economic impact of AB 594. Consequently, we have had to develop approximations of the necessary cost, profit and employment factors for several of the industries and to make a number of simplifying assumptions in order to produce our final estimates. Because of the necessity of using these techniques, the estimates of economic impact in this report should be regarded as approximations of magnitude and not be considered as precise determinations. Despite the lack of precision and refinement in our methodology and results created by the data constraints, we believe that our conclusions are reasonable and should provide useful guidelines to the Legislature in its deliberations on the proposed legislation.

Estimating Methodology

On the basis of our analysis of the structure of the beverage industry and review of other studies in this area, we concluded that the critical factors which would determine the ultimate impacts would be the effect of the bill on (1) total beverage consumption, (2) mix of beverage container types, and (3) the return rates, or percentage of containers returned by the consumer. The effect on these factors would, in turn, determine the sales, profit, employment and investment impacts for each industry.

For the first two factors, i.e., sales and container mix, estimates were made for three levels which define a range of potential impact. The three levels, or "scenarios", may be described as follows:

Case I - Minor Impact. This case represents an estimate of the minimum decline in total consumption that could be reasonably expected and the minimum shift in container mix from cans and one-way bottles to refillable bottles.

Case II - Moderate Impact. This case represents an intermediate or middle point between the minimal impact of Case I and and the major impact of Case III. It should not be construed as an estimate of the probable or "most likely" outcome, but simply as the midpoint between the limits of the range.

Case III - Major Impact. This is our estimate of the most severe impact that could reasonably be expected as a result of the bill in terms of the decline in sales and shift in containers.

The third factor, container return rates, proved to be extremely difficult to evaluate. We were unable to obtain any actual data on current experience with refillable bottles, and expert opinions, as well as actual evidence, on the effect of a mandatory deposit were varied and conflicting Consequently, return rates were assumed to be constant for all three cases.

Table 1 sets forth the consumption and container mix estimates for the three cases.

TABLE 1

ESTIMATED IMPACT OF AB 594
ON CONTAINER MIX AND SALES VOLUME
SOFT DRINK AND BEER

	Current	Case I Minor Impact	Case II Moderate Impact	Case III Major Impact
Soft Drinks				
Change in Total Sales Volume		-5%	-10%	-15%
Container Mix:				
Returnable Bottles	31%	55%	70%	85%
Nonreturnable Bottles	16	10	5	-0-
Cans	53	35	25	15
Total	100%	100%	100%	100%
Beer				
Change in Total Sales Volume		-0-	-5%	-10%
Container Mix:				
Returnable Bottles	6%	25%	45%	65%
Nonreturnable Bottles	22	20	15	10
Cans	72	55	40	25
Total	100%	100%	100%	100%

Summary of Findings

The impact of container mix and sales volume changes will bring about the following economic change in the affected beverage production and distribution and container industries.

(1) Employment and Payrolls. Increased employment in beverage production and distribution industries of 2,300 to 4,200 will result from the greater labor requirements associated with producing and handling returnable bottles, despite some loss of sales volume. Loss of market share for cans and a shift from one-way to returnable bottles will reduce employment in the can manufacturing and glass container industries by 1,800 to 4,800 jobs, more than offsetting employment gains in other sectors in the most severe case. We estimate net changes in employment in all industries to range from a gain of 500 jobs to a loss of 600. Payrolls will change from a plus $2 million to a decline of $17 million.

(2) Investments. The container-mix shift will require significant new investments in beverage production and distribution to convert or add bottle filling lines, bottle washers, warehouse space, delivery equipment, and inventories of returnable bottles. Bottle manufacturers will require some additional investments in molds, but can manufacturers should be unaffected in this respect. Total investment requirements are estimated at $150 million to $320 million.

(3) Profits. Profits before taxes will decline as a result of the drop in sales volume in all industries, and the shift to the less profitable refillable package will further reduce earnings in the beverage industries. The annual loss of net profits before taxes is estimated to range from about $90 million to over $200 million.

The following observations can be made on the potential reduction in litter volume and the resulting impact on litter collection and disposal activities.

(1) Because the total number of beverage containers produced annually should decline by 2.0 billion to 5.2 billion, the litter potential related to beverage consumption will be substantially reduced.

(2) A reduction of litter disposal costs on the order of $2 million annually, is possible, but no significant reduction in litter collection costs incurred by state and local governments is expected.

Table 2 displays our estimate of the economic impact on the beverage and container industries. It should be emphasized again that these estimates are based on approximate relationships that were, in many cases, derived from sources other than industry-furnished data. The following characteristics of these estimates should also be noted.

(1) The values shown represent the total impact induced by changes in consumption in California. In the case of soft drinks, out-of-state production of beverages and containers is not significant. In the case of beer, however, approximately 60 percent of California consumption is produced out-of-state. The impact of consumption changes would, therefore, be felt only partially within California. No attempt was made to develop a definitive estimate of the in-state effect, because we believe that a significant shift could occur in market shares of in-state versus out-of-state brewers. It would be highly speculative, however, to attempt to predict the magnitude of this shift.

We have calculated, for purposes of illustration, that the effect on employment in California, assuming no change in market shares, would be job gains of 2,100 to 4,000 in the beverage, wholesaling and retailing industries, partially offset by losses of 1,100 to 3,000 jobs in the container manufacturing industries, or a net increase of 1,000 jobs.

(2) The sales and profit impacts assume no change in prices for specific product lines. We believe that some part of the decline in dollar sales volume and the corresponding loss of profits could be recovered through higher prices. Again, this area is higly speculative, and data on price elasticities and industry cost structures are not sufficiently precise to provide a definitive basis for an estimate.

(3) The amounts shown as the decline in profits before taxes in this table are based in part on the average ratio of net operating income (income before depreciation, debt service charges, taxes and special charges or credits) to sales value, as reported by Standard and Poor's for the applicable industry. The changes in profits before taxes reflect both the estimated changes in sales volume and the identifiable additional costs related to the change in product mix. The computation of the loss of profits on this basis assumes that all costs other than depreciation and debt service charges are variable and, thus, the effect of other irreducible overhead expenses (i.e., "fixed costs") is not recognized. This computational method was employed because of a lack of data in all affected industries except the soft drink and the glass container industries.

(4) We have not included in our estimates of capital investments any costs that might be associated with conversion of the "flip-top" can to any other type of easy-open can.

Beverage containers with severable, "flip-top" openings have been banned, effective January 1, 1979, by the enactment of Chapter 428, Statutes of 1975, (AB 1037) and it would therefore not be appropriate to attribute any related expenditures to AB 594.

TABLE 2

SUMMARY OF ESTIMATED ECONOMIC IMPACT OF AB 594 ON BEVERAGE AND CONTAINER INDUSTRIES/a

	Soft Drinks	Brewers	Beer Wholesalers	Bottle Manufacturers	Can Manufacturers	Retailers	Total
Case I							
Employment	+508	+286	+327	-182	-1,582	+1,153	+510
Payrolls (Millions)	$+6.1	$+3.7	$+3.9	$-2.2	$-19.0	$+9.2	$+1.7
Capital Investments (Millions)	$+122	$+24	$+3	$+2	--	$+2	$+153
Net Profits Before Taxes (Millions)	$-45	$-9	$-6	$-1	$-15	$-14	$-90
Case II							
Employment	+674	+358	+411	-632	-2,743	+1,946	+14
Payrolls (Millions)	$+8.1	$+4.6	$+4.9	$-7.6	$-32.9	$+15.6	$-7.3
Capital Investments (Millions)	$+184	$+48	$+6	$+4	--	$+3	$+245
Net Profits Before Taxes (Millions)	$-72	$-23	$-12	$-3	$-26	$-25	$-161
Case III							
Employment	+786	+402	+461	-1,049	-3,798	+2,641	-557
Payrolls (Millions)	$+9.1	$+5.2	$+5.5	$-12.6	$-45.6	$+21.1	$-17.3
Capital Investments (Millions)	$+238	$+68	$+9	$+5	--	$+4	$+324
Net Profits Before Taxes (Millions)	$-96	$-35	$-19	$-5	$-35	$-36	$-226

/a Total impact on both in-state and out-of-state brewers, bottle manufacturers and can manufacturers.

Conclusions

Viewing the proposed mandatory deposit strictly from the standpoint of litter abatement, the proposal appears to have two clearly identifiable advantages.

(1) Based on the Oregon experience, this type of legislation has potential for substantially reducing the volume of beverage-related litter. The extent of litter abatement in Oregon is still subject to some dispute, and a precise quantitative determination of the reduction, particularly with respect to total litter, is dependent on many factors, including sampling procedures, sampling frequency, and method of measurement (i.e., piece count vs. volume or weight). We have made no attempt in this study to make a quantitative estimate of the reduction in beverage-related litter that might be expected in California from AB 594. However, the potential for littering should be reduced substantially, based on our estimates that 2.0 billion to 5.2 billion fewer cans and bottles will be produced annually.

Further, the economic incentive we believe is sufficient to insure that most beverage containers will be returned for the deposit, if not by the purchaser then by individuals or groups engaged in scavenging containers for the deposit value. We conclude therefore that despite the reported uniqueness of the Oregon experience, we could expect that abatement of beverage-related litter would also be substantial in California.

(2) The law has further appeal in that it requires no extensive administrative or enforcement machinery; and involves minimal continuing intervention by government in the private sector.

From a resource and energy conservation standpoint, the law has further advantages which we have not attempted to assess. Most claims of benefits in this area are based on the assumption that the law, as it has in Oregon, will effectively eliminate steel and aluminum cans as a container for beer and soft drinks. We are not convinced that this would occur in California, and, in fact, are suggesting the possibility that cans could retain a significant share of the beverage container market. The energy and resource conservation impact in this case would be minimal.

The approach to litter control proposed by AB 594 has the following disadvantages.

(1) It is directed at only one element of litter, albeit a highly visible one. It does not address itself to the problem of the many paper and plastic packaging materials that become a component of litter, nor to the numerous nonpackaging materials which also contribute to the accumulation of debris in public parks and along the highways.

(2) Implementation of the proposal would result in economic disruptions, and would adversely impact on beverage and container producers. This consequence raises the question of equity when considered in light of the fact that in California clearly less than one-half of all litter, regardless of how measured, is composed of beverage containers.

We believe that the Legislature should consider alternatives to the mandatory deposit as a means of litter abatement. In particular, a plan of litter control similar to that proposed by AB 2353 (Z'berg) of the 1975-76 Regular Session, may be a more equitable and less economically disruptive approach than the mandatory deposit.

Such a proposal would contain the following provisions:

(1) A minimal excise tax to be imposed on sales of all containers, packaging materials, and other metal, glass, paper or plastic products which have been identified as significant litter components.

(2) A program of litter control financed from the proceeds of the tax which would include the following:

(a) More frequent, comprehensive and effective litter collection efforts.

(b) Realistic penalties for littering violations, accompanied by accelerated enforcement of litter laws.

(c) A litter prevention program including placement of more litter receptacles in public areas and comprehensive anti-littering educational efforts.

This approach is not without disadvantages. The imposition of a "litter tax" would require administrative machinery and would undoubtedly involve certain compliance problems. The tax would likely be shifted to the consumer and, thus, impose an economic burden on individuals who are not guilty of contribution to the litter problem. This argument, however, is equally appropriate for the mandatory deposit system. It imposes an economic cost in the form of the loss of convenience associated with the one-way container on all beverage consumers, not just those who discard the container carelessly.

The major elements of the proposal described above have been successfully implemented in the State of Washington. This approach to litter abatement lends itself to implementation on a trial basis more readily than a mandatory deposit system because of the minimal economic disruption involved. If implemented and determined to be unsuccessful, such a plan could be terminated and the mandatory deposit system could then be initiated.

It should be noted that the above observations are made in the context of the currently perceived problem of controlling litter. Long-range problems of conservation of energy and other resources may ultimately dictate other, more stringent restrictions on the use of throw-away containers and packaging materials. This longer-range problem is, however, beyond the scope of this report.

CHAPTER II

THE BACKGROUND

SECTION A

THE BEVERAGE CONTAINER PROBLEM

Origins - Concern Over Litter

During the last decade there has been a growing nationwide concern over the increasing volume of litter on public roads, lands and beaches. The popularity of convenience-type, nonreturnable soft drink and beer containers, the apparent propensity of consumers to discard this type of container carelessly, and the fact that these containers are a highly visible portion of litter has focused public attention on this area. During the last several years, this concern has been translated into a variety of legislative proposals to deal with the problem. A survey by the Environmental Protection Agency indicated that over 356 litter control bills have been introduced in recent years at the national, state and local levels, dealing specifically with beverage containers. The proposals included provisions to prohibit some types of containers, to require deposits on others, to impose a "litter tax" on all containers and to reduce litter through educational programs.

Enacted and Proposed Legislation in Other States

The first law restricting beverage containers was passed in 1953 by the State of Vermont. This bill imposed a complete ban on nonreturnable beer bottles. The law expired in 1957 and was not renewed, because, reportedly, it had no impact on litter. Recently, Vermont enacted a new mandatory deposit law which will be reviewed briefly later in this report South Dakota's new law will ban, starting in 1976, nonreturnable or non-biodegradable bottles and cans. Municipalities with container-deposit legislation in effect include Ann Arbor, Michigan; Bowie, Maryland; and Oberlin, Ohio. The most notable and most publicized beverage container law is Oregon's Minimum Deposit Law, popularly known as the "bottle law". This legislation and its effects will be discussed in detail later in this report.

Over a dozen bills modeled after the Oregon law were introduced last year in as many states, but none was enacted. A number of national "bottle bills" has been proposed in Congress. Last year a U.S. Senate subcommittee held extensive hearings, but did not act, on Oregon Senator Hatfield's bill that would impose a national ban on the sale of nonreturnable beverage containers.

Previous Studies on Proposed Beverage Container Regulation

Several major studies have been prepared which deal with the subject on a nationwide level and additional studies have been undertaken at the state level.

National Studies. The following sections describe two major national studies prepared by private research firms, one for an industry group and the other under contract with the Environmental Protection Agency. A summary is included of those findings which are relevant to our economic impact analysis of AB 594.

These two studies are:

(1) Midwest Research Institute (MRI), The National Economic Impact of a Ban on Nonrefillable Beverage Containers, Kansas City, Missouri, 1971.

Commissioned by the soft drink, beer, can and glass container-manufacturing industries, this study examines the potential economic impact of a nationwide ban on nonrefillable carbonated beverage containers.

(2) Bingham, T.H., and Mulligan, P.F., The Beverage Container Problem, Analysis and Recommendations, Research Triangle Institute (RTI/EPA), Washington, D.C., 1972. Prepared for the U.S. Environmental Protection Agency, this study examines the beverage container problem from the environmental standpoint, analyzes various alternative governmental policies and makes recommendations for alleviation of the problem. The report considers 10 alternative proposals, including a ban on certain containers, mandatory deposits, litter tax, educational campaign and subsidies to affected industries for possible governmental action. This summary covers only one of these alternatives, mandatory deposits, because that is the one most relevant to provisions of AB 594.

Key findings of the MRI study relative to the national impact of a ban on nonrefillable containers may be summarized as follows:

1. Sales declines on the order of eight percent would probably occur in both soft drinks and beer due to reductions in the number of outlets and brands inventoried and diminution in consumer convenience.
2. The ban would terminate an estimated 66,000 jobs in the steel, metal can, and glass industries and add 56,000 equivalent full-time jobs in beverage production, distribution, and retailing. Jobs lost would, in general, be more skilled and higher paying than the jobs gained.

3. New investments aggregating $1.06 billion would be required to convert the beverage industry to an all returnable bottle basis. (Note: adjusting by the change in the U.S. BLS index of machinery and equipment prices between 1969 and 1974 would increase this amount to $1.54 billion.)

The mandatory deposit alternative of the RTI/EPA study assumed a 10-cent deposit requirement imposed on all beer and soft drink containers. Summary results of this study are as follows:

1. The 10-cent deposit would result in the elimination of all cans and nonrefillable containers.
2. Both beer and soft drink consumption would decline by four percent.
3. Employment increases in the beverage and retailing industries would total 60,800, marginally higher than aggregate losses of 60,500 in the container industries, resulting in a net gain of 300 jobs nationally. The RTI/EPA study concurs with the MRI study conclusion that the higher skill levels of jobs lost would result in a net negative impact on incomes and that total payrolls would decline nationally by about $114 million.
4. New investments of $1.17 billion would be required for the conversion. (This amount is equal to approximately $1.70 billion in 1974 dollars.)

With respect to the relative impact on an individual industry basis, the conclusions of the two reports were similar. The adverse financial impact would be most severe for the can manufacturers, followed by sheet-metal and bottle manufacturers. Within industries, the contract canners (firms filling cans under contract to franchise or warehouse brand bottlers) in the soft drink industry would suffer the most severe financial consequences, and many firms in this group would be forced out of business.

Additional details of the findings of these two studies are contained in Appendix A, Tables A-3 and A-4.

State Studies. Several of the state legislatures which have recently considered Oregon-type mandatory deposit proposals have commissioned studies to analyze the impact of such proposals on their respective states. They include the States of Connecticut, Maine, Maryland, Minnesota and New York. The New York study is reviewed here because it appears to be the most comprehensive and relates to a state comparable to California in terms of population size, distribution of per capita income, and beverage consumption patterns.

The study, which was published by the State Senate Task Force on Critical Problems, examines the possible alternative solutions to the non-returnable beverage container problem. Drawing upon past studies and actual experience of other states with various approaches to this problem, the task force chose a mandatory deposit on all beverage containers as the recommended solution. It concludes that of the various alternative approaches a mandatory deposit system would best meet its objectives of litter control and resource and energy conservation, while providing maximum flexibility for industry and minimum interference by government.

Detailed analyses of the energy and economic impacts of a mandatory deposit system were developed by private consultants and their reports are included in the final task force report./1

/1 New York State Senate Task Force on Critical Problems, No Deposit, No Return - A Report on Beverage Containers, Albany, New York, February, 1975.

The report predicts that a mandatory deposit system would most likely result in a major shift to refillable beverage containers and summarizes the economic effects of such a shift as follows:

1. A 70 percent decline in beverage container consumption resulting from the shift to refillable bottles.
2. Increase in the returnable container share of carbonated beverage sales from the current 10 percent to 80 percent to 90 percent.
3. A slight decline in average retail carbonated beverage prices.
4. No significant impact on beverage sales volume.
5. A net increase of 4,000 in employment, composed of 5,200 new jobs in beer and soft drink manufacturing and distribution, offset by a loss of 1,200 jobs in the container manufacturing and beverage canning industries.
6. New capital investments of $176 million for the affected industries, over a three-year transition period.
7. An estimated $40 million annual savings to consumers in beverage costs plus unquantified potential savings in trash collection and litter cleanup.

Details of the New York study are set forth in Tables A-1 and A-2 of Appendix A.

SECTION B

THE OREGON EXPERIENCE

The Oregon Minimum Deposit Law

Because AB 594 was largely modeled after Oregon legislation which has been in effect for over two years, we believe that a comprehensive review of the Oregon experience is useful in the consideration of the proposed California law. It has been stated that Oregon has unique characteristics and that differences between the two states are such as to make any comparison meaningless. We believe, however, that the differences may not be as great as has been alleged and that with proper adjustments to the data and with the proper selection of data, we can draw some conclusions about the potential impact of the bill in California on the basis of the Oregon experience. In the following paragraphs, therefore, we have described the Oregon situation in some detail, beginning with a description of the law itself, a comparison with the proposed California law and an evaluation of the economic impacts of the bill, as reported by various research organizations.

Because of data collection problems and the use of different analytical techniques by research groups reporting on the Oregon situation, some aspects of the results in Oregon are still the subject of dispute. The controversial nature of the issue has led to differing interpretations between proponents and opponents not only over the magnitude of the impacts but, in some cases, over the direction of the changes as well. The controversy is particularly acute with respect to the effect of the law on the volume of litter, where different techniques have been employed for measuring quantities of litter and changes in those quantities.

Specific Provisions of the Oregon Law

Oregon's "bottle bill" was signed into law in June 1971, and became effective October 1, 1972. The primary purpose of the law was to encourage the use of refillable carbonated beverage containers which, in turn, was expected to reduce the volume of litter and solid waste.

The law contained the following key provisions:

1. Banned the sale of carbonated soft drinks and beer cans with detachable (e.g., "flip-top" or "rip-pull") openings.
2. Required a minimum 5-cent deposit on all carbonated beverage containers sold in the state. However, certain standardized, interchangeable bottles which are accepted for refill by more than one beverage manufacturer may have a minimum deposit value of 2 cents.
3. Required retailers and distributors of beer and carbonated soft drinks to accept for return and pay the appropriate deposit value on all beverage containers having such value.
4. Provided for the establishment of container redemption centers by private entrepreneurs, to facilitate the return of empty beverage containers.
5. Mandated the Legislative Fiscal Committee of the Oregon Legislature to report, by January 1, 1975, on the following:
    a. The actual economic impact of the law on affected industries;

b. The effectiveness of the law in reducing beverage container litter;

c. The cost of enforcing provisions of the law; and

d. Recommendations for further legislative proposals, resulting from findings of the report.

Since its enactment, there have been numerous proposals to amend the Minimum Deposit Law. Enacted amendments include clarification of language to insure payment of refund to all persons and language to prevent proliferation of certified containers. Unsuccessful attempts to change the law included proposals to relax the container certification procedure, and to provide retailers of beer and carbonated soft drinks with a 1-cent handling charge for returnable containers. Attempts have also been made to extend the law to noncarbonated beverages, wine and liquor, and certain food containers.

Initially, six different types and sizes of beer bottles have been "certified" (i.e., declared acceptable for refill by more than one brewer) by the Oregon Liquor Control Commission. These included the 11-ounce "stubby," the 12-ounce, as well as the 32-ounce crown-top and screw-top plain returnable bottles. At this writing, however, only the 11-ounce "stubby" crown-cap and the 32-ounce screw-cap beer bottles remain certified. The others have been withdrawn from the market and decertified, in order to prevent proliferation of certified bottles. To date, there has been no request from industry for certification of interchangeable soft drink bottles.

Although the law provided for establishment of container redemption centers, none has been established as of this writing.

Oregon's "Bottle Law" vs. The California "Bottle Bill"

Oregon's Minimum Deposit Law was used as a model for drafting California legislation (AB 594) and the two are identical in most respects, except for the following notable differences:

1. Assembly Bill 594 provides for a minimum 5-cent refund value on all beer and carbonated soft drink containers. It does not provide for a reduced, 2-cent refund value on "certified" (i.e., interchangeable) containers.
2. The California bill requires beverage manufacturers, as well as retailers and distributors, to accept the returned empty containers having a deposit value and to refund the appropriate deposit. The Oregon law does not extend these requirements to manufacturers of beer and soft drinks. This means that Oregon brewers, who do not sell directly to retailers, do not have to accept the returned empty containers for refund of their deposit value. Under the California bill they would have to do so. In case of soft drinks, bottlers and canners of this beverage are considered "distributors" by both the Oregon law and the California bill, meaning that they must accept the empty containers and refund the appropriate deposit value.
3. The Oregon law, as amended, provides for payment of the appropriate refund value to "any person" returning eligible empty containers to retailers. The amendment, enacted in 1973, changed the original wording of the law from "consumer" to "any person," after it was found that some retailers refused

to pay minors the appropriate refund value on beer containers under the theory that they were not legal "consumers" of beer. The California bill requires payment of refund to "consumer", but not to "any person."

4. Oregon law provides for the establishment of redemption centers for the empty containers, AB 594 has no such provision.

Initial Experience With the Law

At the time of its enactment, the Minimum Deposit Law was regarded by its proponents as a significant step toward reducing the volume of beveraged container related litter and solid waste in Oregon. In addition, it was expected to conserve energy and other natural resources. Its opponents, on the other hand, predicted an increase in beverage prices, inconvenience to consumers and major negative economic impacts on the affected industries, without significant reduction in energy consumption or in the total litter and solid waste volume.

In January 1972, a group of beverage producers and container manufacturers challenged the constitutionality of the law in the Oregon Circuit Court.

The court's decision, rendered in September 1972, found the "bottle law" constitutional. This decision was upheld by the Oregon Court of Appeals and a subsequent request by plaintiffs for a review by the Oregon Supreme Court was denied. No further legal action was initiated.

Effects of the Oregon Law

Two major comprehensive studies were undertaken on the economic consequences of first year's operation under the law. The first study was conducted by Professors Gudger and Bailes at Oregon State University [2] and the second by Applied Decision Systems, Inc., (ADS),[3] a private consulting firm commissioned by the Oregon State Legislature to fulfill the law's requirement for a post-enactment evaluation. Of the two reports, the ADS study is the more detailed and comprehensive, and, in our opinion, presents the most valid findings. The following paragraphs summarize the economic effects in Oregon based largely on the ADS report and supplemented by data from a third report prepared by Don Waggoner of the Oregon Environmental Council.[4] This latter report deals primarily with the litter aspect of the law, but contains some second-year economic impact data. Where the Gudger and Bailes report substantially disagrees with ADS we have so indicated.

Effect on Litter. According to the ADS report, the volume of beverage container related litter declined by 66 percent during the first year of the law. However, the volume of nonbeverage related litter did not drop, but increased by 12 percent during the same period. As a result, the volume of total litter declined by only 10.6 percent, because beverage related litter comprised only 30 percent of the total litter volume. The Oregon State University Study, however, reported an 88 percent decline in the volume of beverage container related litter during the same period.

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[2] Gudger, C.M. and Bailes, J.C., The Economic Impact of Oregon's Bottle Bill, Oregon State University Press, March 1974.

[3] Applied Decision Systems, Inc., Study of the Effectiveness and Impact of the Oregon Minimum Deposit Law, Wellesley Hills, Mass., October 1974.

[4] Waggoner, Don, Oregon's Bottle Bill--Two Years Later, Columbia Group Press, Portland, Oregon, May 1975.

The Waggoner report claims that beverage container litter was reduced by 73 percent during the first year and by 83 percent during the second year of the law. An industry group's analysis[/5] of the same litter statistics shows a 52 percent increase in the volume of beverage-related roadside litter during the second year. The difference in these findings is due partly to incomplete and often inconsistent "pre- and post-law" litter statistics compiled by the State of Oregon which make uniform, consistent analysis of these statistics difficult. Nevertheless, most of the available information indicates that the law has been successful in reducing the beverage container share of total litter and solid waste.

Impact on Beverage Sales. All three reports concur that the Minimum Deposit Law did not have a significant or lasting negative effect on the volume of beer or soft drink sales.

During the initial year of the law, the growth of packaged beer sales slowed to about one percent, but rose again by 5.7 percent during the second year, above the historical growth rate of 5.3 percent. The initial decline was attributed to a shift in consumption from 12 and 16-ounce containers to the "certified" 11-ounce bottles. The relative market share of national and regional brewers remained unchanged, but foreign and specialty brands lost one-half of their market share.

Soft drink sales are not as well documented as beer sales and impact estimates range from a slight drop to a moderate gain. On a volume basis, sales were unchanged from the previous year. A four percent decline in the

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[/5] Wagner, George L., Dozendorf, et.al.,--memorandum to Rocky/Marsh dated June 4, 1975.

number of containers sold, reported by the ADS study, was attributed primarily to an increase in the average size of containers. Franchise brands (e.g., Coca Cola, Pepsi, 7-Up) continued to grow on both a container unit and volume basis, but sales of warehouse brands (e.g., Shasta) and private labels (e.g., Cragmont of Safeway) declined by 40 percent both on a volume and unit-container basis during the initial year.

Price Impacts. During the last two years, carbonated beverage prices have increased significantly. The price of sugar, an important soft drink ingredient, skyrocketed during 1974. Consequently, any law induced price change would be difficult to isolate and identify. Findings of the various studies indicate no significant change in average prices for either packaged carbonated soft drinks or beer directly attributable to the law. Generally, price increases in individual container-types are attributed to factors other than the law.

The ADS study reported a five percent decline in average soft drink prices during the first year of the law. As sales shifted from nonreturnable bottles and cans to returnable bottles, however, there was a concurrent increase in prices of soft drinks in the returnable containers. The question of whether or not this increase was due directly to the law has not been answered.

Average packaged beer prices per ounce rose by two percent in the first year. Brewers acknowledged that the higher prices were primarily the result of general inflationary conditions, rather than the result of the law. Beer distributors reported a shift in marketing emphasis from the higher volume, low markup containers to lower volume, but higher margin packages.

Container Mix and Return Rates. The law brought about a major shift in the beverage container mix. For soft drinks, returnable bottles increased their market share from 53 percent to 88 percent during the initial impact year and to 91 percent during the second year. There was also a shift in sales toward the larger-sized bottles. The can share of soft drink sales declined from 40 percent to 12 percent during the first year and dropped further to nine percent during the second year. Because the law banned cans with detachable "flip-top" openings, soft drinks were sold in flat-top cans or in cans with push-tab openings. Nonreturnable bottles disappeared from the market.

Return rates for the traditional refillable bottles were 96 percent before the law and remained unchanged after it. Can return rates averaged about 62 percent during the initial impact year and this rate increased to an estimated 70 percent during the second year of the law. An increasing portion of the returned empty cans were being recycled.

For beer sales, refillable bottles increased their share from 31 percent before the law to 96 percent after it. Most of the bottled beer is now sold in 11-ounce "stubby" standardized bottles, certified by the Oregon Liquor Control Commission and acceptable for refill by any brewer producing for the Oregon market. The can share of total beer sales (in push-tab or flat-top cans) declined from 41 percent to about four percent and nonreturnable bottles disappeared from the market.

Beer bottle return rates averaged 78 percent to 88 percent after the law. Because of additional transportation costs, national brewers shipping into Oregon received only 30 percent to 35 percent of their bottles back, losing many of their certified, 11-ounce interchangeable bottles to local and regional brewers. As a result, the in-state return rate for these certified bottles ran as high as 101 percent during the initial impact year.

Table 3 summarizes the impact of the law on carbonated beverage container mix and return rates.

TABLE 3

EFFECT OF THE MINIMUM DEPOSIT LAW
ON CONTAINER MIX AND RETURN RATES

	Soft Drinks			Beer		
Container Mix Percent of Total Sales	Before the Law	One Year After Law	2 Years After the Law	Before the Law	One Year After Law	2 Years After the Law
Refillable Bottles	53%	88%	91%	31%	96%	96%
Nonrefillable Bottles	7	0	0	28	0	0
Cans	40	12	9	41	4	4
Totals	100%	100%	100%	100%	100%	100%
Return Rates						
Refillable Bottles	95.7%	95.9%	95.9%	81% to 88%	78% to 88%	78% to 88%
Cans	0	62	70	0	No data	No data

Sources:
1. Applied Decision Systems (ADS) study, op. cit.
2. The Oregon Bottle Bill - Two Years Later, op. cit.
3. Analysis of Nielsen soft drink marketing data and Oregon Liquor Control Commission beer sales data for 1973-74.

Overall, this change in containerization resulted in usage of about 134 million fewer bottles and 252 million fewer cans in the state, as reported by the Oregon State University study.

Economic Impacts. The first year economic consequences of Oregon's "Bottle Law" were evaluated in detail by both the ADS and Oregon State University reports. The data-base, methodology and time-frame of these two reports differ in many respects and their conclusions also vary significantly. As indicated earlier, we attach more credibility to the ADS report because the research methodology appeared to be more valid and the findings were more carefully documented. We present the findings from both of these reports not to compare or contrast them, but to indicate that the economic consequences of the law have not and probably cannot be determined with absolute accuracy.

Table 4 summarizes the impact on operating income (net profits before taxes) for each of the affected industries, as reported by the ADS and Oregon State University studies.

TABLE 4

ESTIMATED IMPACT OF THE OREGON BOTTLE LAW
ON OPERATING INCOME OF THE AFFECTED INDUSTRIES
(Millions)

Affected Industries	Oregon State /a University Study	ADS Study /a Low	 High
Soft Drink Manufacturers	$+2.8	$-3.1	$-3.5
Brewers	+5.3	-.9	-1.2
Beer Distributors	-.6	-.7	-1.5
Retailers	-2.9	No data /b	
Glass Bottle Manufacturers	-.3	+.07	+.1
Can Manufacturers	-.4	-2.3	-2.5
Net Totals	$+3.9	$-6.9 to	$-8.6

Much of the difference in conclusions reached by the two studies in Table 4 can be traced to the result of different findings regarding return

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/a Figures are rounded to the nearest thousand.
/b The information provided by retailers was insufficient to provide meaningful estimates.

rates or trippage (the number of refills) for returnable bottles before and after the law. The Oregon State University study indicated significant increases in beer and soft drink bottle return rates after the law, while ADS found only a slight increase in beer bottle and no change in soft drink bottle-return rates. These differences in return rates significantly affect container costs for brewers and soft drink manufacturers, as well as sales volume and profits for the glass container manufacturing industry. The Oregon State University study estimated $16.2 million savings in container costs to brewers and soft drink manufacturers which offset not only the additional operating costs for these two industries, but also offset losses in other industries for a total net positive impact of $3.9 million. The considerably smaller changes in return rates found by the ADS study resulted in much smaller savings in bottle costs for producers of beer and soft drinks. Consequently, losses to beverage container manufacturers could not be offset from savings by brewers and soft drink manufacturers. First year gain in profits for glass producers reported by ADS is related to higher volume in the first year required to build up inventories of returnable bottles.

The Oregon State University study did not offer the detailed employment and investment impact estimates for each of the affected industries provided by the ADS study. It did provide a total employment impact estimate for all of the affected industries and some additional investment data which will be included in our discussion.

The impact range on employment and investments for each of the six industries, as reported by the ADS study, are detailed in Table 5.

TABLE 5

EMPLOYMENT AND INVESTMENT IMPACTS
OF THE OREGON BOTTLE LAW,
AS DETERMINED BY THE ADS STUDY

	Employment (Number of Jobs)		New Investment (Millions)	
	Low	High	Low	High
Soft Drink Manufacturers	+82 /a	+98 /a	$+3.5	$+4.5
Brewers	+50	+60	+2.2	+3.2
Beer Distributors	+43	+50	+.4	+.5
Retailers	No estimate /b		No estimate /b	
Glass Bottle Manufacturers	-200	-200	0	0
Can Manufacturers	-140	-162	+.3	+.3
Net Totals	-165	-154 /c	$+6.4	$+8.5

/a Composed of 142 to 148 new jobs for soft drink bottlers and a loss of 50 to 60 jobs for contract canners.

/b Retailers did not supply ADS with sufficient data to provide an adequate basis for estimates.

/c This figure differs from the net total figure of -227 included in the ADS report. The difference is the result of ADS including additional loss of jobs by glass bottle manufacturers under the "high" impact category. These additional job losses did not actually occur, but would have occurred had the manufacturers not been able to shift production of other bottles to their Oregon plants to take up some of the idle capacity.

The ADS employment impact figures were recently adjusted in response to critics who pointed out that the original estimates did not include employment increases for retailers and for common carrier trucking. This latter industry is involved in distribution of beer and soft drinks and reported increased employment as a result of the law. These adjustments included the addition of 20 new jobs for common carrier trucking and 200 to 250 new jobs for retailers. This changed the net total employment impact for the affected industries from the originally estimated net reduction of 154 to 165 jobs to a net increase of 55 to 116 jobs.

The adjusted ADS figures still differ from Oregon State University's net total employment impact estimate of +365, because they represent net changes in full-time jobs, not equivalent increases based on man-hours worked, as reported in the university study. This study also reported a total of $5.3 million in new capital investments, but did not completely identify the law induced increases in this category.

Summary

The primary objective of the Minimum Deposit Law was to reduce the incidence of beverage container littering and reduce the total volume of litter and solid waste by encouraging the use of refillable beverage containers. It was enacted with the intent of accomplishing these objectives at minimum economic cost to business and at a minimum loss of convenience to consumers.

Available information on the law during its first two years of operation indicates that the law has been at least partially successful in meeting its primary objective. Both the beverage container share and total volume of litter and solid waste appears to have been reduced. There has been a significant decline in the total number of beverage containers used, without any significant lasting effect on total beer and soft drink sales volume and any major law induced change in average prices of these beverages.

While some of the affected industries found it more difficult to adjust than others, the adverse economic impact of the law on these industries appeared to be less severe than originally envisioned. From an administrative standpoint, the law has been successful and appears to have the continued support of most Oregonians.

SECTION C

THE VERMONT EXPERIENCE

Legislative History

In 1953, Vermont became the first state to enact legislation restricting the sale of beverage containers. The law banned only nonreturnable beer bottles which allowed brewers to shift production to cans. Consequently, the beverage container share of litter was not reduced. The law expired in 1957 without any attempts for its renewal.

In 1972, the state enacted another beverage container law. For the first two years of its operation, this statute imposed a litter tax on all nonrefillable beverage containers. Revenues from this tax were used for maintenance of sanitary landfills and for the establishment of a solid waste recycling program.

Starting July 1, 1973, the law required a minimum 5-cent deposit, in lieu of the litter tax, on all beverage containers, except those for liquor and wine. The litter tax continued to apply on containers for these beverages. The law also required a reimbursement of 20 percent of the deposit to the retailer for administering the deposit. No provision was made for a standardized, certified bottle. Efforts to repeal the law were unsuccessful and legal action by retailers was dismissed for insufficient cause.

Effects of the Law

Reliable empirical data on the effects of the law are so limited that only general observations can be made.

Because the law does not specifically require the use of refillable bottles, most of the state's major brewers and distributors continue to market beer in nonreturnable bottles by labeling them for deposit, then disposing of those which are returned. Returnable bottles are being used by an increasing number of soft drink producers with some of the franchise bottlers shifting their entire production to these containers. The return rate on these bottles is about 90 percent.

Carbonated beverage sales declined and prices rose upon enactment of the law, but lack of reliable data makes it impossible to determine conclusively whether or not these changes were related at all to the legislation. Supporters of the law attributed them exclusively to factors other than the law.

There is little information on the impact of the law on the affected industries. Several soft drink bottlers report declining production costs and some retailers and beer distributors claim additional investment and labor costs, but these data are insufficient even for general observations on the impact.

CHAPTER III

ANALYSIS OF ECONOMIC IMPACT OF AB 594 ON BEVERAGE AND CONTAINER INDUSTRIES

SECTION A

GENERAL - IMPACT ON BEVERAGE CONSUMPTION

It is probable that the enactment of AB 594 would have a fairly significant effect on the container mix in both the beer and carbonated beverage markets and could also adversely affect sales volume in these industries in California.

Several factors indicate that the share of nonrefillable containers in the market would decline. First, the imposition of the mandatory deposit would cause some consumers to switch to the refillable bottle simply because of a psychological resistance to the unconventional idea of a deposit on a nonrefillable can. Secondly, the storage and returning of cans presents problems of sanitation and handling for the consumer. Third, to the extent that prices of refillable bottles remain below the prices of convenience containers, marginal consumers will shift for purely economic reasons. Finally, retailers may adopt marketing tactics designed to encourage a switch to returnable bottles because of sanitation and handling problems for retailers that would be associated with returned cans.

The mandatory deposit and the ban of the detachable top resulted in substantial declines in the sale of beverages in nonrefillable containers in Oregon. Sales of beer in cans dropped from 33 percent of total sales to 4 percent in the second year after the law, and nonrefillable bottles disappeared from the market. Sales of soft drinks in cans fell from 40 percent to 9 percent, and nonrefillable soft drink bottles also vanished. Projections made in other studies of the effect of a mandatory deposit have assumed that nonreturnable containers would be eliminated.

Despite these indications that the returnable bottle would overwhelmingly dominate the beverage markets, we believe the possibility exists that in California cans could maintain a significant share of both beer and soft drink sales. This conclusion is based on a number of considerations. First, the nine percent can share of total soft drinks in Oregon is the result of the efforts of a single non-franchise brand producer to stay in the market with cans. This producer, Shasta Beverages, developed a simple but workable system for the collection of returned cans which was designed to overcome the handling problems facing the retailers. Other producers made no such efforts, and many retailers were opposed to stocking canned beverages. We believe that the Shasta system could be used successfully by other producers, or that other techniques could be designed which would minimize the handling and sanitation problem. The relative size of the California market compared to Oregon would, in our opinion, motivate both beverage producers and can manufacturers to develop systems that would facilitate the return and collection of cans.

An important characteristic of beer consumption in California weighs heavily in favor of a strong position for cans in the California beer market. One out-of-state brewer, Adolph Coors Company, has captured 40 percent of the market in California, despite a price premium of approximately 10 percent. This producer, who currently ships exclusively in aluminum cans and one-way bottles, would have a strong economic incentive to vigorously promote the continued sales of beer in cans.

Estimates provided by representatives of the beer industry (four brewers, representing 75 percent of the market) and the soft drink industry (eight bottlers accounting for 40 percent of the market) are consistent with our conclusion that one-way containers could maintain a significant market share. These estimates are shown in Table 6.

TABLE 6

INDUSTRY ESTIMATES OF IMPACT OF AB 594 ON CONTAINER MIX FOR SOFT DRINKS AND BEER IN CALIFORNIA

	Beer		Soft Drinks	
	Current	Projected (Industry Estimates)	Current	Projected (Industry Estimates)
Returnable Bottles	6%	36%	31%	70%
Nonreturnable Bottles	22	7	16	4
Cans	72	57	53	26

Our estimates span a broad range of potential impacts on container mix for the two industries. These estimates are as follows:

TABLE 7

ESTIMATED IMPACT OF AB 594 ON CONTAINER MIX FOR SOFT DRINKS AND BEER IN CALIFORNIA

	Current	Case I Minor Impact	Case II Moderate Impact	Case III Major Impact
Soft Drinks				
Container Mix				
Returnable Bottles	31%	55%	70%	85%
Nonreturnable Bottles	16	10	5	--
Cans	53	35	25	15
	100%	100%	100%	100%
Beer				
Container Mix				
Returnable Bottles	6%	25%	45%	65%
Nonreturnable Bottles	22	20	15	10
Cans	72	55	40	25
	100%	100%	100%	100%

Note that our mid-point estimate, (Case II) for soft drinks corresponds approximately to the bottlers' estimate, which we believe is reasonable. The brewers' estimates for the can share, however, we believe to be on the high side of the potential range.

Some decline in sales volume is possible for beer and likely in the case of soft drinks under the provisions of AB 594. Marginal consumers will substitute other beverages, and retailers may reduce the number of brands available to consumers, because a strong shift to the bulkier refillable bottles would increase the amount of retail shelf space necessary to stock the same quantity and variety of beverages. Data from Oregon indicates the following changes in consumption (on a volume basis) after the law as compared to national trends:

TABLE 8

CHANGES IN OREGON BEER AND SOFT DRINK CONSUMPTION
OREGON VS. UNITED STATES

	Percent Change From Previous Year			
	Oregon		United States	
	1973	1974	1973	1974 (Est.)
Beer	+1.4%	+5.7%	5.0%	5.1%
Soft Drinks	-0-	+4.0	6.5	NC/a

/a Soft drink consumption was depressed nationally because of major price increases stemming from high sugar prices.

The national study conducted by Midwest Research Institute estimated a decline of eight percent in consumption of both beverage categories, resulting from a total ban on nonreturnable cans. This estimate was based largely on the collective judgment of industry representatives. The EPA/RTI study estimated a loss in sales volume of four percent in both industries from the imposition of a 10-cent deposit. (AB 594 proposes a 5-cent deposit.)

Beverage industry estimates project sales declines in California of 15 percent and 27 percent for beer and soft drinks, respectively, resulting from AB 594. We believe these projections are unduly pessimistic and not supportable by evidence.

Retail grocers were also surveyed to elicit estimates of the bill's impact on their soft drink and beer sales volume. Responses were fragmentary and no consensus emerged. Of the eight major grocery chains, three declined to provide estimates, two estimated no change in sales of either beer or soft drinks and the remaining three estimated reductions of 10 percent to 30 percent for soft drinks and six percent to 12 percent for beer.

The argument has been made that the Oregon experience cannot be extrapolated to California because of significant differences in geographic, demographic, and economic characteristics of the population, as well as differences in consumer attitudes and life styles. We concur that the impact in Oregon would probably not be duplicated exactly in California. We believe, however, that the Oregon experience cannot be completely ignored and there is little merit in the contention that the impact in California would be radically different with respect to changes in consumer demand for beer and soft drinks. Californians, for example, have been characterized as more affluent and convenience-oriented than residents of other states. Comparative personal income data indicate that Californians are in fact more affluent than Oregonians; personal income per capita in California exceeded that in Oregon by 16 percent in 1974. It may be argued, however, that the more affluent California buyer of convenience packaging would be less likely to substitute other beverages because he/she will be more willing and able to pay the required deposit on the can or one-way bottle, and might so do with no expectation of returning the container.

Greater mobility of the California population, as indicated by the large number of motor vehicles and licensed drivers in the state, has been cited as one important difference in life style. The evidence here, however, does not support the assertion. The number of motor vehicles and licensed drivers are lower in California than in Oregon on a per capita basis.

It has also been argued that the impact on sales volumes in California would be more severe, because the current market share held by convenience containers is higher than it was in Oregon prior to the enactment of the Oregon law. This argument is valid, and the effect of this difference can easily be estimated if we make the logical assumption that the loss of sales occurred entirely in the can and one-way bottle categories. The decline from the levels that would have been obtained in Oregon by 1974 with growth rates equal to the national average are estimated to be on the order of three percent for both soft drinks and beer. Adjustments for the container-mix differential would yield losses in the range of 4 percent to 4-1/2 percent. Even if we double the estimated losses in Oregon to six percent to allow for estimating errors and higher Oregon growth rates, the adjusted losses are still less than 10 percent in both cases, significantly below industry estimates for California.

Finally, statistical analysis of the national demand characteristics of soft drinks and beer indicate that both beverages are inelastic with respect to price, i.e., have price elasticities of less than unity. We may hypothesize that the consumer will perceive a mandatory deposit as an increase in price and will adjust consumption accordingly. The consumer will either explicitly treat the 5-cent deposit as part of the price and not return the container, or will place some value less than 5 cents on the inconvenience of returning the container and then, in fact, do so in order to collect the deposit.

In either case there is some additional cost involved to the consumer, but that cost is limited to the amount of the deposit. The question then is what change in consumption will be induced by the additional cost to the consumer. Our statistical analysis of per capita beer and soft drink demand considered several explanatory variables including package mix, age distribution of the population, and per capita income, as well as price levels for beer, soft drinks and substitute beverages. In Table 9 below, the results of the analysis are shown for two estimation techniques, (1) using the absolute values of the price index for beer and soft drinks and (2) using relative price level changes, i.e., commodity price indices deflated by the Consumer Price Index. In estimating the demand effect, the mandatory deposit was treated as a price increase amounting to approximately 17 percent for beer and 19 percent for soft drinks. The changes in demand shown in Table 9 thus represent estimates of consumer response to a permanent price increase of 5 cents per container. A summary of our econometric analysis is set forth in Appendix B.

TABLE 9

EFFECT OF MANDATORY DEPOSIT
ON DEMAND FOR BEER AND SOFT DRINKS

Beer	Case I Minor Impact	Case II Moderate Impact	Case III Major Impact
Percent of Market in One-Way Containers	55 %	40 %	25 %
Percent Decline in Demand:			
Estimate (1)	-3.2	-3.9	-4.6
Estimate (2)	-4.9	-5.8	-6.7
Soft Drinks			
Percent of Market in One-Way Containers	45 %	30 %	15 %
Percent Decline in Demand:			
Estimate (1)	-5.9	-11.0	-16.1
Estimate (2)	+.4	-4.1	-8.5

On the basis of this analysis and the several considerations enumerated above, we have estimated a range of five percent to 15 percent loss of sales for soft drinks and a range of no effect to 10 percent loss in sales of beer. If these estimates contain any bias, it is probably in the direction of an overemphasis on the initial change in beverage consumption patterns. To the extent that such a bias exists, the long range economic impact will be less severe than our projections.

Our analysis of the economic impact of these changes in consumption levels and container mix on each of the affected industries are presented in the following sections. Each section contains a brief summary of our findings, a profile of the industry, a description of our data sources and estimating methodology, and a discussion of the specific impacts on the industry. The detail of all calculations is contained in Appendix C.

SECTION B

SOFT DRINK INDUSTRY

Summary of Findings

The following economic impacts are estimated for the soft drink industry in California. The range of values in each case represents the values associated with the "minor impact" (Case I) and "major impact" (Case III) estimates of sales volume loss and container-mix change as described in Section A of this chapter.

(1) Sales Volume. A decline of $77 million to $191 million annually, resulting from reduced consumption and the shift to the lower priced returnable containers.

(2) Employment and Payroll. A net increase of 508 to 786 full-time jobs, with the effect of reduced production more than offset by the greater labor intensity of the product mix. The additional total payroll cost would range from $6 million to $9 million.

(3) Investments. New investments of $122 million to $238 million would be required for additional production and distribution equipment.

(4) Net Profits Before Taxes. A decline of $45 million to $96 million would result from reduced volume and higher costs.

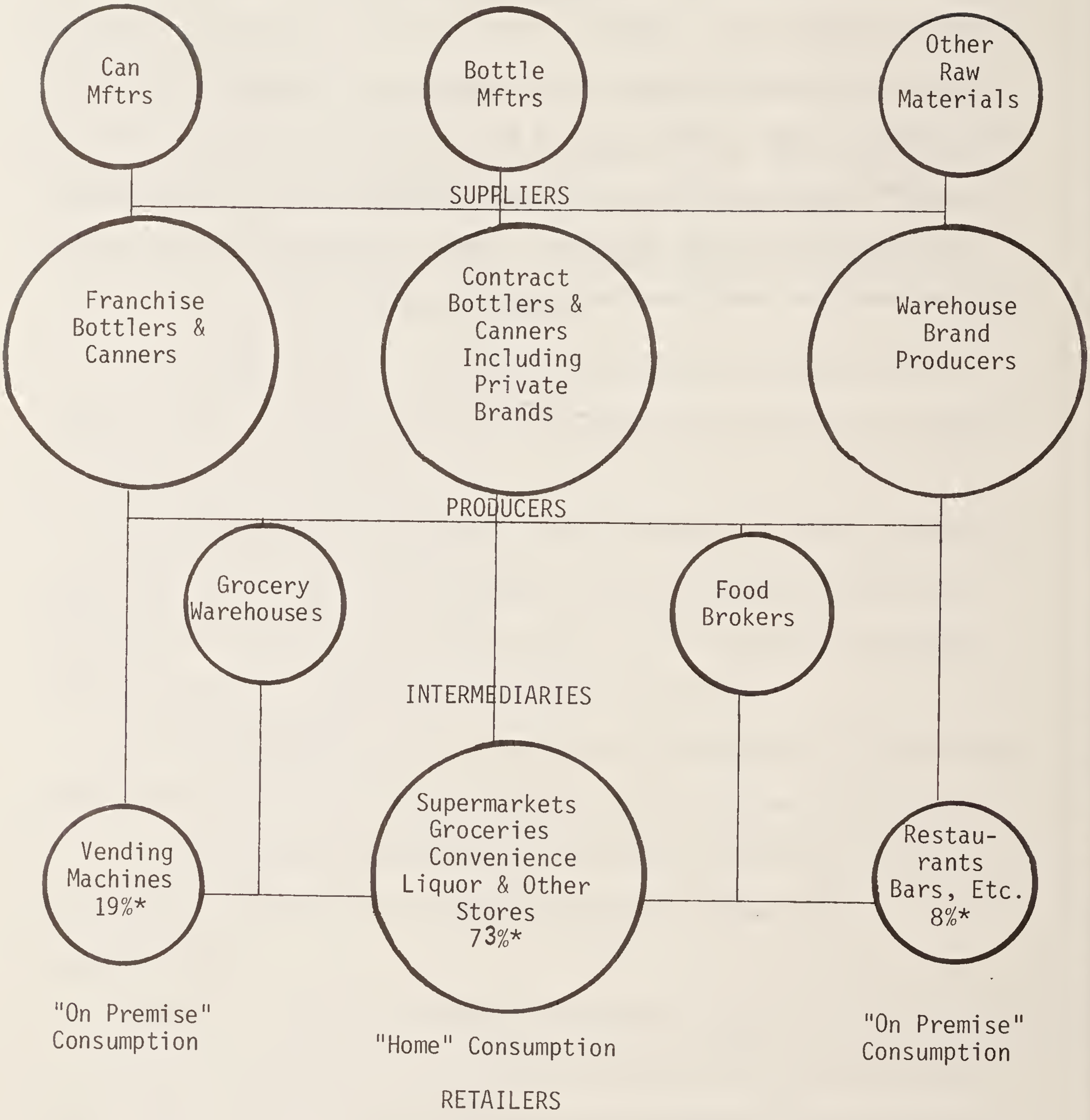
Industry Profile

General. In 1974, Californians purchased the equivalent of 2.9 billion 12-ounce containers of soft drinks, valued at $720 million at the retail level. Soft drinks in California are produced by 94 individual companies, which operated 108 plants with over 7,000 employees.

The California soft drink industry consists of firms which produce only franchise brands (e.g., Coca Cola, Pepsi, Royal Crown), or only the warehouse brands (e.g., Shasta), as well as those firms which bottle and can both franchise and private (e.g., Cragmont of Safeway and Harvest Day of Lucky's) brands. Figure 1 shows the structure of the state's carbonated soft drink industry which, for illustration purposes, also includes container manufacturers and retailers. Impact of the bill on these sectors will be analyzed under separate sections in this report.

FIGURE 1

STRUCTURE OF THE CALIFORNIA SOFT DRINK INDUSTRY



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* These figures represent the respective shares of the total packaged soft drinks sold through these outlets, as reported by the Zenith Research Group, An Economic Impact of a Mandatory Deposit System for Containers in the California Soft Drink Industry, Los Angeles, April 1975, p. 10.

Types of Producers. To understand the potential impact of AB 594 on the soft drink industry it is important to differentiate among the three major groups comprising that industry: franchise brands, warehouse brands and private labels.

Franchise canners and bottlers are locally franchised producers of national brands, such as Coca Cola, Pepsi and Royal Crown. These companies account for about 65 percent of the total California sales volume. They contract with the national parent companies for the exclusive production, distribution and sale of specified brands within a designated geographic area.

Starting in the 1940's, major grocery chains such as Safeway, Lucky's and Albertson's began to market their own, private label (e.g., Cragmont, Harvest Day and Happy Times) soft drinks to compete with the franchise brands. These private brands are produced either by the parent company's own plants, or by contract bottlers and canners and account for 20 percent of the total soft drink sales in the state.

The major difference in the operations of franchise and private label manufacturers is in the distribution of their products. The franchise bottlers and canners deliver to their retail outlets in their own trucks and even stock the store shelves, while the private labels are shipped by their producers to the central warehouses of chain stores where they are consolidated with other products for shipment to the individual retail outlets.

Warehouse brands (e.g., Shasta) are produced by independent soft drink companies under their own brand names. Currently, they have 15 percent of the California market. Their products are also shipped to central warehouses of their retail customers and are marketed therefrom through the distribution system of the purchasing retail stores in the same manner as private labels. As a result of cost-savings through this central distribution system, private and warehouse brands usually retail below the price of their franchise counterparts.

Franchise bottlers and canners market their products both in returnable and nonreturnable bottles, as well as in cans. Private label and warehouse brands are sold primarily in nonreturnable containers.

Package Mix. Approximately 80 percent of soft drinks are sold in packaged form, the remaining 20 percent in bulk form for on premise consumption. The current package-mix for California soft drink sales is shown below:

Container Type	Percent of Packaged Sales
Returnable bottles	31%
Nonreturnable bottles	16
Cans	53
Total	100%

This current package mix, contrasted with the 1967 package mix of 81 percent in returnable bottles, nine percent in one-way bottles and 10 percent in cans, is indicative of the recent trend in consumer preference toward convenience type containers.

Comparing the 1974 nationwide container mix of 37 percent in returnable bottles, 27 percent in nonreturnable bottles and 36 percent in cans with the California mix for the same year indicates that the nonreturnable packages comprise a slightly higher share (69 percent versus 63 percent) of the total California soft drink sales than they do of the total nationwide sales.

The 94 soft drink bottlers and canners are located throughout the state near population centers. Their sizes vary, depending on the size of the market they serve. Approximately 66 percent of them are located south of Fresno, serving the more heavily populated southern California market. Currently, there appear to be no significant differences between northern and southern California soft drink companies in the manufacturing, pricing and distribution of their products.

Data Collection and Estimating Methodology

Data for the soft drink industry was compiled by the Zenith Research Group under contract with the California-Nevada Soft Drink Association./6 Members of this association produce approximately 95 percent of soft drinks consumed in California. Their report provided data on current sales volume; relative unit sales values, and container mix for eight bottlers, representing 40 percent of the total production of the association. Data from the eight firms was expanded to represent aggregate data for the association members. The report presented the industry's estimates of the impact on sales, gross profits, employment and new investment. No data was provided on actual unit sales values, actual production costs or production man-hour requirements by product line, i.e., container size or type. Average unit sales values for refillable bottles were estimated to be 75 percent of that for nonrefillable containers. The average gross profit margin was estimated to be unchanged by variations in product mix, implying unit production costs in proportion to sales values for all types of containers. No data was

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/6 Zenith Research Group, An Economic Impact Study of a Mandatory Deposit System for Containers in the California Soft Drink Industry, Los Angeles, California, April 1975.

furnished for direct production labor cost differentials for returnable bottles versus cans. Time and motion studies were conducted on warehousing and distribution labor requirements and man-hour indicies were provided which represented relative labor inputs for refillable bottles versus nonrefillable containers.

The report provided the industry's estimates of the effect on sales volume, employment, investment and net profits before taxes.

As previously discussed, we disagree with the industry's projection of the adverse effect on sales volume. Our economic impact estimates are based on a less severe range of losses. In developing our economic estimates we used relationships derived from the data contained in the report for all impact categories, except operating income. In the latter case we used the methodology described on page 7 in order to be consistent with projections for other industries.

Economic Impacts

Sales Volume. The dollar volume of soft drink sales would be adversely affected by the drop in demand for soft drinks and the higher percentage of sales in returnable bottles. Based on the Zenith report estimate that the average sales value per unit for returnable bottles is 25 percent below that of one-way containers, we project the following declines in sales volume:

	Case I Minor Impact	Case II Moderate Impact	Case III Major Impact
Sales Volume in Millions of Equivalent 12 oz. Containers	-260	-520	-780
Percent Change	-5%	-10%	-15%
Sales Volume in Millions of Dollars	$-77	$-135	$-191
Percent Change	-11%	-20%	-27%
Average Price Per Unit	$.130	$.125	$.120

These sales values assume no change in prices for each package type. The change in average prices is due solely to the container mix. It is probable that both relative prices and absolute price levels could be adjusted by the bottlers to attempt to recoup some of the losses in sales and the incurrence of higher costs. The evidence in Oregon regarding this aspect is not clear and we do not have sufficient data on price elasticities or unit costs by product type to attempt to estimate the magnitude of the adjustments. The loss of sales would probably not be distributed uniformly throughout the industry. Warehouse brands and private labels, at least initially, would suffer relatively greater losses than franchise brands. With respect to distribution outlets, vending machine sales would be subject to the greatest losses as compared to retail grocers and convenience stores.

Employment and Payrolls. The number of jobs in the soft drink industry would be affected by both the decline in consumption and the shift in container mix. Production of carbonated beverages in returnable bottles, which are heavier and bulkier than cans or one-way bottles, requires additional labor for warehouse handling and distribution, as well as labor for handling and processing of returned empty bottles. The Zenith report states that the warehouse and distribution labor requirements per unit are 78.6 percent greater for returnable bottles than for the average of nonreturnable containers. Using this relationship and the reported total number of warehouse and distribution employees in the industry, we calculated the following employment impacts:

	Case I Minor Impact	Case II Moderate Impact	Case III Major Impact
Change in Total Sales Volume	-5%	-10%	-15%
Percent of Sales in Returnable Bottles	55%	70%	85%
Employment (No. of Man-Years)			
Effect of Volume Change	-247	-494	-741
Effect of Mix Change	+755	+1,168	+1,497
Net Effect	+508	+674	+786
Payrolls (Net Change, Millions of Dollars)	$+6.1	$+8.1	$+9.4

As the table shows, the increase in jobs from the mix change more than offsets the employment decline from lower production levels.

Investment. Capital investments would be required for production equipment to convert existing lines or to acquire new bottling lines. Additional warehouse space and transportation equipment would be required, and an inventory of returnable bottles would have to be acquired. Estimates for the industry, as reported by the Zenith group, totalled $65.8 million in new investments based on an annual increase of 593 million units in production of beverages in 12 oz. returnable bottles. As discussed earlier, these estimates are predicated on a total decline in production volume of 27 percent and an increase in the market share of returnable bottles from 31 percent to 70 percent.

Using the reported data, we calculated a relationship of investment requirements to the increase in volume of returnable bottles and estimated the following capital investment requirements:

	Case I Minor Impact	Case II Moderate Impact	Case III Major Impact
Increase in Production of 12 oz. Refillable Bottles (Millions of Units)	1,105	1,664	2,145
New Capital Investment Required (Millions of Dollars)	$122	$184	$238

These estimates in all three cases are higher than the Zenith report estimates, because we are assuming higher production levels by the industry.

Net Profits Before Taxes. The lower sales volume and the increased market share of the less profitable returnable container will adversely affect profits in the industry. Our estimate of the loss of net profits before taxes is an follows:

	(Dollars in Millions)		
	Case I Minor Impact	Case II Moderate Impact	Case III Major Impact
Reduction in Sales Volume	$77	$135	$191
Reduction in Operating Profits Due to Sales Volume	13.9	24.3	34.4
Increase in Operating Costs:			
Labor, Warehouse and Distribution	6.3	9.6	12.6
Other Expenses	25.0	37.7	48.8
Total Reduction in Net Profits Before Taxes	$45.2	$ 71.6	$ 95.8

The effect of the loss in total sales is based on the industry (nationwide) average net operating income as a percent of sales for the five-year period 1970 through 1974, as reported by Standard and Poor's The additional labor costs reflect the increase in warehouse and distribution personnel discussed above, and other expenses include utilities, property taxes and insurance, and interest on investment in new facilities. Increases in direct production labor costs are offset by reduced container costs.

Producers of warehouse brand and private label soft drinks would be affected more severely by the bill than their franchise-brand counterparts. Current production of these two manufacturers is almost exclusively in nonreturnable containers. Consequently, they would require major investments in order to remain in the market. In addition, they would have to initiate two-way distribution systems and design effective procedures for collecting and disposing of empty cans. Because the economic data were submitted to us in consolidated form to protect individual company figures, we could not make separate impact estimates for these two categories of producers.

The costs of handling returned empty cans is not considered explicitly in these estimates. Under the system developed in Oregon by Shasta Beverages, the major part of the handling costs are borne by the soft drink canner who retrieves the empty cans in plastic containers in which they have been accumulated by the retailer. Costs estimates for this operation and estimates of can return rates indicate that handling costs are more than offset by unredeemed deposits. It appears that with this type of handling system, can return rates would have to approach 100 percent before any net cost would be incurred. Return rates are currently averaging 80 percent to 85 percent in Oregon. For these estimates, therefore, we have assumed no net financial impact for can return activities. The Zenith report did not address the question of handling returned cans.

SECTION C

BREWING INDUSTRY

Summary of Findings

The following economic impacts are estimated for brewers producing for the California market. The range of values in each case represents the values associated with the "minor impact" (Case I) and "major impact" (Case III) estimates of sales volume loss and container mix change as described in Section A of this chapter.

(1) Packaged Sales Volume. A decrease of $16 million to $100 million annually. This decline would be the combined result of the drop in sales volume and the anticipated shift in container mix from higher valued nonrefillable containers to lower valued refillable containers.

(2) Employment. An increase of 286 to 402 full-time jobs, for additional production warehousing and handling labor. Payroll costs would increase by $4 million to $5 million.

(3) Investments. An increase of $24 million to $68 million for additional production equipment and warehouse space.

(4) Net Income Before Taxes. A decline of $9 million to $35 million stemming from reduced volume and higher costs.

Industry Profile

In 1974, Californians bought nearly 15 million barrels (465 million gallons) of beer, produced by local, regional, national and foreign brewers. Of that total volume, about 6 million barrels (186 million gallons), or 39 percent was produced by eight in-state breweries, most of them plants of national breweries, located near major metropolitan areas. The balance was shipped in from other states by regional and national brewers. Table 10 shows California beer sales by brewers for 1974 and also provides an overview of the nature and composition of the brewing industry serving the California market.

TABLE 10

1974 CALIFORNIA BEER SALES BY BREWERY
(In Barrels of 31 Gallons)

		Calendar Year to December 31, 1974			
Brewing Companies	Type/a	California Production Sold in California	Shipments into California	Total Barrels	Percent of Total
1. Adolph Coors Co.	R	---	6,055,783	6,055,783	40.4%
2. Anheuser-Busch	N	2,330,881	755,169	3,086,050	20.6
3. Olympia	R	---	1,532,394	1,532,394	10.2
4. Jos. Schlitz	N	966,714	21,963	988,677	6.6
5. Theodore Hamm	N	835,332	28,508	863,840	5.8
6. Miller Brewing	N	758,967	22,280	781,247	5.2
7. General Brewing	L	521,032	163	521,195	3.5
8. Pabst Brewing Co.	N	322,582	2,308	324,890	2.2
9. Falstaff Brewing Corp.	N	163,483	---	163,483	1.1
10. National Brewing	N	---	142,027	142,027	0.9
11. Carling Brewing Co.	N	---	99,510	99,510	0.6
12. Blitz-Weinhard	R	---	70,033	70,033	0.5
13. Pearl Brewing Co.	R	---	55,597	55,597	0.4
14. G. Heileman Brewing	N	---	43,480	43,480	0.3
15. Rainier Brewing Co.	R	---	39,176	39,176	0.3
16. Steam Beer Brew'g Co.	L	6,134	---	6,134	0.0
17. Other US Co's	-	---	25,032	25,032	0.2
18. Outside USA	-	---	176,842	176,842	1.2
Totals		5,905,125	9,070,265	14,975,390	100.0%
Percentages		39.4%	60.6%	100.0%	

Source:

U.S. Brewers Association, Western Regional Office Statistical Report, January 28, 1975, p. 1.

/a Type of brewery:
N: National brewers with plants located nationwide, some in California, as indicated by their production figures under the "California Production Sold in California" column.

R: Regional brewers, located in nearby states.

L: Local brewers, headquartered in California.

A noteworthy feature of the California beer market is the strong position maintained by the two major regional brewers, Coors and Olympia. Table 10 shows that these two companies, located in Colorado and Washington, respectively, account for well over one-half of the total California beer sales volume. National brewers with plants in California are a distant second in their combined share of total sales and local brewers account only for an insignificant portion of the total sales.

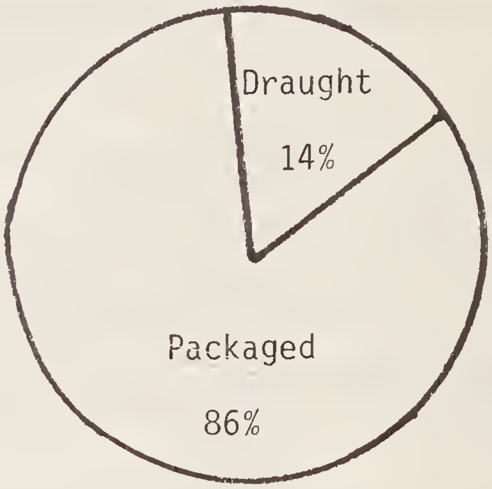
As of 1974, in-state brewers had a total of $443 million invested in plant and equipment, employed 2,100 persons with a total payroll of $21 million, and spent $146 million on production materials, shipping and utilities./7

The current sales mix by type of container of total California beer sales is shown in Figure 2. This current mix, contrasted with the 1934 sales mix of 55 percent draught beer and 45 percent in returnable bottles with no nonreturnables, is indicative of the trend in consumer preference toward convenience packaging. Cans, in particular, dramatically increased their market share during the last decade.

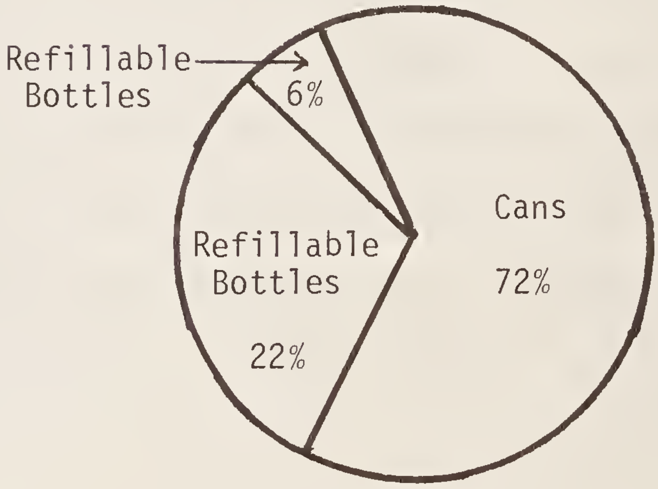
/7 U.S. Brewers Association, Western District, California Brewing Industry Statistics and Reference Information, San Francisco, 1973, 1974.

FIGURE 2

CALIFORNIA BEER SALES BY TYPE OF CONTAINER



Total Sales



Packaged Sales

Source: These figures are our estimates, based on container-mix data supplied by the U.S. Brewers Association, Western Regional Office, as well as by the individual brewers producing for the California market. They represent the container-mix of the major national, regional and local brewers in the California market, and account for 90 percent of total sales.

Most of the beer produced in California is sold to wholesalers who ship it to their warehouses for retail distribution. Local brewers usually sell on a delivered basis. Out-of-state breweries ship their products by both truck and rail to their California distributors and sell either on a F.O.B. or delivered basis.

Data Collection and Estimating Methodology

We initially requested data through the Western District Headquarters of the United States Brewers Association. Data requested included sales values, direct production costs, labor requirements, and gross margins; all on a unit basis for each product line (i.e., container type and size). We also invited the industry to provide us with their estimates of the impact of the bill. The response to our initial request contained aggregate production, sales and employment data, and a discussion of the problems that the brewers perceived with the proposed legislation. No unit cost or profit data was provided, however. In a second attempt to obtain the data, detailed questionnaires were sent directly to each of seven brewers producing in total approximately 90 percent of beer consumed in the state. None of these questionnaires was returned directly to our office. The national headquarters office of the U.S. Brewers Association collected four of the questionnaires (accounting for approximately 75 percent of California's consumption) and provided us with a summary of the total actual production volume by container type and estimated production levels under the proposed legislation. No further details were provided. Consequently, in making our estimates of economic impact we have derived cost, employment and investment factors from other sources, primarily the national studies discussed in Chapter II as well as data supplied by brewers in Oregon for the ADS study. The development of these factors is detailed in Appendix C.

Economic Impact

Sales Volume. Brewers sales would decline in dollar volume as a result of both lower consumption levels and change in container-mix. Based on posted prices of individual container sizes and types, we estimate the average price of beer in returnable bottles to be 15 percent below the price of one-way containers. Our estimates of the range of volume changes are shown below:

	Case I Minor Impact	Case II Moderate Impact	Case III Major Impact
Sales Volume in Millions of Equivalent 12 oz. Containers			
Change in Units	-0-	-215	-430
Percent Change	-0-	-5%	-10%
Sales Volume in Millions of Dollars			
Change in Amount	$-16	$-59	$-100
Percent Change	-3%	-11%	-18%
Average Price Per Unit	$.126	$.122	$.119

As in the case of soft drink bottlers, the sales values assume no change in prices for individual package types and the declining average price is due entirely to package mix. Again, we believe that prices might ultimately be adjusted upward to recapture profits.

Employment and Payrolls. The impact on employment would be similar to that in the soft drink industry, with the loss of jobs related to lower production levels more than offset by higher labor requirements per unit for production of beer in returnable bottles. The added employment per unit would be relatively less important in the brewing industry than in soft drinks. The distribution function, where a significant portion of the increase in jobs would be required, is an integral part of the soft drink bottling industry. Beer distribution, however, is carried out by beer wholesalers, a separate industry. Our estimates of the employment impact are shown below:

	Case I Minor Impact	Case II Moderate Impact	Case III Major Impact
Change in Total Sales Volume (Units)	--	-5%	-10%
Percent of Sales in Returnable Bottles	25%	45%	65%
Employment (No. of Man-Years)			
Effect of Volume Change	--	-198	-396
Effect of Mix Change	+286	+557	+798
Net Effect	+286	+359	+402
Payrolls - Net Change (Millions of Dollars)	$+3.7	$+4.6	$+5.2

Investments. As in the soft drink industry, additional investments would be required for new production lines, handling equipment, and additional bottle inventories. In general, canning lines are not convertible to bottling lines. Additional storage space would be required for the bulkier refillable bottles, both for the increased volume of filled and unfilled bottles. Based on data from other studies and assuming new investments in proportion to increased production of refillable bottles, we estimate the following investment requirements.

	Case I Minor Impact	Case II Moderate Impact	Case III Major Impact
Increase in Production of Refillable Bottles (Millions of Units)	817	1,580	2,257
New Capital Investment (Millions of Dollars)	$24	$48	$68

Net Profits Before Taxes. Profits would decline as a result of reduced consumption, lower average price, and increased operating costs. Our estimate of the loss of net profits before taxes is as follows:

	(Dollars in Millions)		
	Case I Minor Impact	Case II Moderate Impact	Case III Major Impact
Reduction in Sales Volume	$16	$ 59	$ 100
Reduction in Operating Income Due to Sales Volume	$2.7	$10.0	$17.0
Increase in Operating Costs:			
Labor - Warehousing	$1.6	$3.1	$ 4.4
Other Expenses	4.8	9.6	13.6
Total Reduction in Operating Income	$9.1	$22.7	$35.0

General. Out-of-state brewers shipping into California would be hit harder by the enactment of the bill than their in-state counterparts. Currently, these companies ship the majority of their products into the state in lightweight, compact aluminum cans. A major shift in the container-mix to refillable bottles would increase significantly their production and transportation costs and would weaken their competitive position *vis-a-vis* local brewers. Because of the added transportation costs, out-of-state brewers would also experience lower return rates for their refillable bottles than local brewers. Beer distributors would be reluctant to pay the additional transportation for returning refillable bottles to the out-of-state brewers, if they had a cheaper alternative to reclaim deposits on these bottles. Unlike the Oregon law, AB 594 does not provide for "certified" interchangeable refillable bottles. The standard-size 12-ounce refillable beer bottle with paper labels, however, may be interchangeable among brewers producing for the California market. Consequently, distributors would prefer returning all these bottles to local brewers to claim their deposit, rather than shipping them back, at their expense, to the original producers. This would provide local brewers with a cheap refillable bottle inventory at the expense of their out-of-state competitors.

SECTION D

BEER DISTRIBUTORS

(WHOLESALERS)

Summary of Findings

Enactment of AB 594 is expected to have the following effect on beer distributors. The range of values in each case represents the values associated with the "minor impact" (Case I) and "major impact" (Case III) estimates of sales volume loss and container-mix change as described in Section A of this chapter.

(1) Packaged Sales Value. A decline of $19 million (3 percent) to $118 million (18 percent), due to the decrease in total sales volume and to the shift in the mix to lower-valued refillable containers.

(2) Employment. An increase of 327 to 461 full-time jobs, primarily for distribution and warehousing labor. Payroll would increase by $4 million to $6 million.

(3) Investments. An increase of $3 million to $9 million for additional warehouse space and distribution equipment.

(4) Net Profits Before Taxes. A decline of $6 million to $19 million.

Industry Profile

Beer wholesalers function as the middleman between brewers and the retail market. Several local brewers bypass the distributor and deliver direct to their retailers, but most of the beer sold in California is marketed through the wholesalers. While some brewers may own and operate their own distributorships, most beer wholesalers are independent businessmen who either sell exclusively for one producer or, more generally, market several brands for a number of producers.

There are approximately 250 beer distributors, located strategically around the major population centers throughout California. They have a total of $350 million in capital investments and employ 6,000 people with an annual payroll of $72 million. The size of these distributors, in terms of number of employees, ranges from 10 to 300 with an average-size distributorship composed of 20 to 25 employees.

In 1974, California beer wholesalers distributed 434 million gallons of beer with the retail market value of about $800 million. The container-mix of that sales volume was discussed in the preceding section on the brewing industry. According to the California Beer Wholesalers Association, the distributors average markup is 18 percent.

Most distributors have the beer delivered to their warehouses by the producer or by common carrier, although some pick up their in-state produced beer purchases in their own trucks at the brewery. In their warehouses, the wholesalers perform the bulk-breaking operation and ship in their own delivery trucks to retail customers. They also pick up the empty returnable bottles which they must return at their own expense to the brewery to reclaim the appropriate deposit value. Currently, they do not pick up empty cans, although some of them jointly built and operate a collection system, including a shredding plant, for empty aluminum cans. The shredded aluminum is returned to a recycling plant in Georgia. An estimated 30 percent of the aluminum beer cans sold in California are currently reclaimed through this system, as well as through the recovery systems of the three aluminum companies operating in California.

Data Collection and Estimating Methodology

A questionnaire requesting current data on actual sales volume, investments, employment and profits, as well as projected impacts under AB 594, was sent to 25 of the 250 California distributors through the industry's trade association. This sample represented about 20 percent of the total beer volume distributed and was stratified to insure representation both as to size and geographic area.

Approximately 50 percent of the questionnaires were returned with varying amounts of information, with only one of the questionnaires being substantially complete. Most of the California beer distributors do not maintain the necessary accounting records to provide the data that would be required for a complete analysis.

In order to make our impact estimates, we supplemented the sketchy California data with information from other studies.

Economic Impact

Sales Volume. Distributors sales volume, both in quantity and dollar amount, would decline as a result of reduced consumption, and dollar volume would be affected by the container mix shift. Estimates of the impact are as follows:

	Case I Minor Impact	Case II Moderate Impact	Case III Major Impact
Sales in Millions of Equivalent 12 oz. Containers			
Change in Units	-0-	-215	-430
Percent Change	-0-	-5%	-10%
Sales Volume in Millions of Dollars			
Amount	$-19	$-70	$-118
Percent Change	-2.8%	-10.6%	-17.9%

Employment and Payrolls. Additional labor required to store, handle, deliver and retrieve the increased volume of returnable containers would more than offset the effect of reduced volume. Our estimates of the net employment impact are shown below:

	Case I Minor Impact	Case II Moderate Impact	Case III Major Impact
Change in Total Sales Volume	-0-	-5%	-10%
Percent of Sales in Returnable Bottles	25%	45%	65%
Employment			
Effect of Volume	-0-	-226	-452
Effect of Mix Change	+327	+637	+913
Net Effect	+327	+411	+461
Net Change in Payrolls (Millions of Dollars)	$+3.9	$+4.9	$+5.5

Investment

Because refillable bottles are bulkier than nonrefillable containers, they require more warehouse space, as well as additional handling and delivery equipment. A major portion of the new investments would have to be made for new delivery trucks to provide the additional space required for delivery of refillable bottles, as well as for pick up of the empty bottles and cans.

We estimate the following new capital investment requirements for beer wholesalers.

	Amount (Millions)
Case I Minor Impact	$3.3
Case II Moderate Impact	$6.3
Case III Major Impact	$9.0

Net Profit Before Taxes. Reductions in sales volume coupled with increases in labor costs will impact heavily on beer wholesalers' income. Our estimates of the decline in operating profits are as follows:

	(Dollars in Millions)		
	Case I Minor Impact	Case II Moderate Impact	Case III Major Impact
Reduction in Sales Volume	$19	$70	$118
Reduction in Operating Income Due to Sales Volume	$1.0	$3.5	$5.9
Increase in Operating Costs			
Labor	$3.9	$7.6	$11.0
Other Expenses	.7	1.3	1.8
Total Reduction in Net Income Before Taxes	$5.6	$12.4	$18.7

SECTION E

GLASS BOTTLE MANUFACTURERS

Summary of Economic Impact

The enactment of AB 594 is expected to have the following effects on glass bottle manufacturers producing for the California soft drink and beer markets. The range of values in each case represents the values associated with the "minor impact" (Case I) and "major impact" (Case III) estimate of sales volume loss and container-mix change as described in Section A of this chapter.

(1) Sales Volume. A decline of 231 million to 950 million equivalent 12-ounce bottles.

(2) Sales Value. A decrease in sales of $4 million to $26 million.

(3) Employment. A net loss of 182 to 1,049 jobs, mostly production labor. This loss would reduce the industry's total payroll by $2 million to $13 million.

(4) Investment. An increase of $2 million to $5 million, primarily for new production equipment.

(5) Net Profits Before Taxes. A decline of $1 million to $5 million.

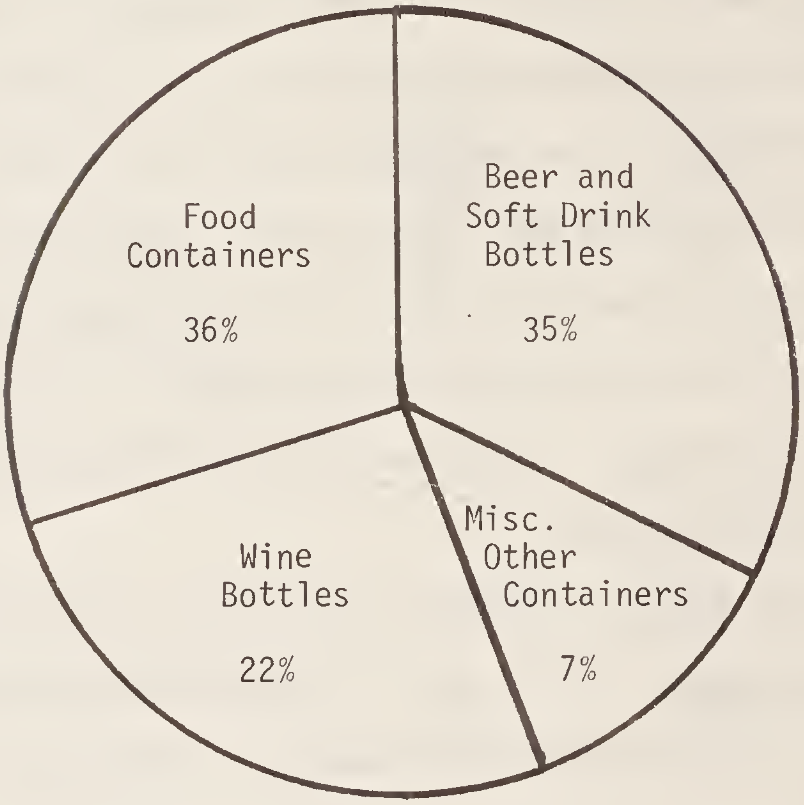
Industry Profile

Information in this section relates to California-based producers only. These companies account for virtually all of the glass containers for bottled soft drinks sold in the state and at least 39 percent of the glass containers for bottled beer sold in California. Although we did not request data from out-of-state producers of beer bottles, they are included in our impact estimates which relate to the total volume of beer and soft drinks sold in California.

Beer and soft drink bottles account for a significant share of the California bottle manufacturers total sales, as shown by Figure 3.

FIGURE 3

CALIFORNIA GLASS CONTAINER SALES
BY TYPE OF CONTAINER

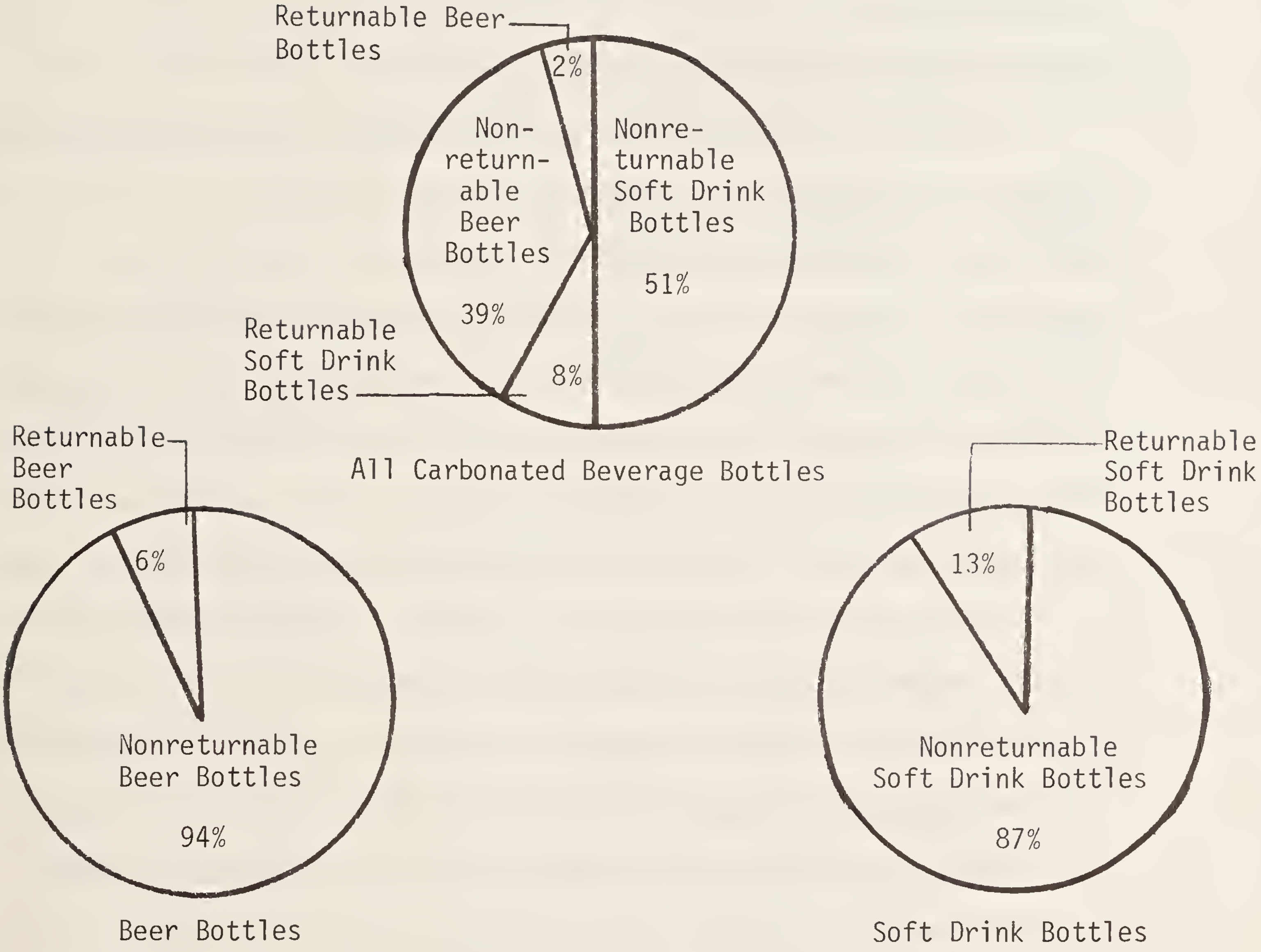


Source: Glass Container Manufacturers' Institute, Western Region.

Out of the 16 plants and 10,252 employees engaged in the production of all types of glass containers in California during 1973, 14 plants with 3,261 employees were directly involved in the manufacturing of beer and soft drink bottles. These plants had $74 million invested in plant and equipment and consumed $67 million worth of raw materials in the production of 1.4 billion carbonated beverage bottles with the market value of $79 million. Their production-mix, by types of container is shown in Figure 4.

FIGURE 4

CALIFORNIA BEVERAGE BOTTLE PRODUCTION
BY TYPES OF CONTAINER



Source: Data from 14 plants of eight bottle manufacturers producing for the California carbonated beverage market, as reported through our questionnaire; 1973 data.

The above data reflect a heavy concentration of California beer and soft drink production in nonreturnable, convenience-type bottles.

For raw materials, the bottle manufacturing industry uses sand, limestone and soda ash, available in virtually inexhaustible supplies in the western states. The industry also has the ability to reuse, through an infinite number of cycles, waste glass (cullet) which accelerates the melting of raw materials, thus reducing the amount of energy required in the manufacturing process.

Data Collection and Estimating Methodology

Two sets of questionnaires were sent to eight glass companies, representing the entire beer and soft drink bottle production in California. The first questionnaire requested the most recent actual data on total sales, employment, investments and unit production costs for each product line. The second, follow-up questionnaire asked producers for their assessment of the bill's impact on their dollar sales volume, investment, employment and profit margins, based on our preliminary estimates of changes in beer and soft drink sales volume, container-mix and empty bottle return rates.

We received full cooperation from all of the eight companies contacted. Their data was consolidated by a consultant retained by the California Glass Containers Manufacturers' Institute prior to sending them to us. This approach was used to preserve confidentiality of each company's data.

This detailed information enabled us to calculate the potential effect of the bill on the industry in areas of sales, employment, investments and profit margins, based on our final estimates of beer and soft drink sales and container-mix.

Economic Impact

Sales Volume. The benefit to bottle producers of the shift from cans to returnable bottles would be more than offset by the reduced demand for one-way bottles. The trippage, or reuse rates of refillable bottles, is a key factor in determining the quantity of refillable containers required for the estimated levels of consumption of beer and soft drinks. As discussed in Chapter II, we have assumed trippage of 10, or a 90 percent bottle return rate for both beverages. Based on this assumption, a shift from one-way to returnable bottles with no change in total consumption would reduce bottle requirements by 90 percent. Our estimates of the impact on glass bottle sales for California consumption are shown below:

	Case I Minor Impact	Case II Moderate Impact	Case III Major Impact
Change in Millions of Equivalent 12 oz. Units	-231	-606	-950
Change in Sales Volume in Millions of Dollars	$-4.0	$-15.5	$-26.1
Percent Change	-5%	-18%	-32%

These estimates are intended to represent the annual ongoing effect of the mandatory deposit system. A major shift to returnable bottles would generate a one-time increase in total volume for glass producers during the period required for the beverage distribution system to build the "float", i.e., the inventory of empty bottles necessary to maintain the two-way system at the higher consumption levels. This build-up is included as a part of the investment requirements for beverage producers and distributors but is not reflected in the estimated glass container sales impact shown above.

Employment and Payrolls. Employment in the glass industry would decline as a result of lower production levels. Direct man-hour requirements per unit furnished by the California Glass Containers Manufacturers' Institute were used to make the following estimates.

	Case I Minor Impact	Case II Moderate Impact	Case III Major Impact
Effect of Increase in Production of Refillable Bottles	+429	+704	+945
Effect of Decrease in Production of One-Way Bottles	-611	-1,336	-1,994
Net Effect (Man-Years)	-182	-632	-1,049
Net Change in Payrolls (Millions)	$-2.2	$-7.6	$-12.6

Investments. Additional capital investments would be required related to the shift from one-way to refillable bottles, consisting primarily of new bottle molds and decorating equipment. Industry data indicates the following range of investment requirements for corresponding increases in refillable bottle production.

	Case I Minor Impact	Case II Moderate Impact	Case III Major Impact
Increase in Refillable Bottle Production (Millions of Equivalent 12 oz. Bottles)	193	325	441
New Investment Requirements (Millions of Dollars)	$2.3	$3.9	$5.3

Net Profits Before Taxes. Operating income will be adversely affected by the loss of sales and to some extent by increased expenses associated with new equipment requirements. Profit margins should otherwise not be significantly affected. Our estimates are shown as follows.

	(Dollars in Millions)		
	Case I Minor Impact	Case II Moderate Impact	Case III Major Impact
Reduction in Sales Volume	$4.0	$15.5	$26.1
Reduction in Operating Income Due to Decline in Sales	$ .6	$2.3	$3.9
Increase in Operating Costs	.5	.8	1.1
Net Effect on Operating Income	$1.1	$3.1	$5.0

General. Unit sales values, labor requirements and profit margins assume no change in the existing size mix of either refillable or one-way glass containers induced by the relative change in market shares.

As mentioned earlier, unit sales values, labor requirements and investments were furnished by California glass container producers. The estimates of the economic impact, however, reflect changes induced by changes in total consumption and container usage in California. Because approximately 60 percent of beer consumed in California is produced out-of-state, some part of the impact would fall on out-of-state glass producers. If we assume no change in the market share for out-of-state breweries, approximately 70 percent of the impact on the glass container industry would be felt in California. However, we believe some shift in the beer market could occur that would benefit both California brewers and container manufacturers.

SECTION F

CAN MANUFACTURERS

Summary of Findings

The enactment of AB 594 is estimated to have the following impact on beverage can manufacturers producing for the California beer and soft drink markets. The range of values in each case represents the values associated with the "minor impact" (Case I) and "major impact" (Case III) estimates of sales volume loss and container mix change as described in Section A of this chapter.

(1) Sales Volume. A decline of 1.8 billion to 4.2 billion 12-ounce beverage cans.

(2) Sales Value. A decrease of $118 million to $283 million.

(3) Employment. A decline of 1,600 to 3,800 in the labor force, primarily production and warehousing employees. Total payroll would decrease by $19 million to $46 million.

(4) Net Operating Income. A decline of $15 million to $35 million.

Industry Profile

Aluminum Can Industry. Two companies produce approximately 1.7 billion cans a year, valued at $122 million, in three California plants. These plants employ 1,035 persons with an annual payroll of $17 million. Their capital investments in plant and equipment total $42 million and this figure is growing, as the aluminum can-share of the total California beer and soft drink sales expands. Each year, these plants purchase about $6 million worth of raw materials and pay $1.1 million in state and local taxes.

The three Califonria plants currently produce only beer and soft drink beverage cans, but future plans call for expansion into some food container lines. One of the plants in southern California also manufactures can-ends. Another can-end plant, located near Sacramento, is scheduled to start operating in 1975.

The aluminum can manufacturing process entails the mechanical stamping of small caps from flat aluminum sheets which are then hydraulically drawn into the desired can size. The end product is a two-piece, seamless can with appropriate labels printed on it, shipped to canners on annual sales contracts. The can-ends are shipped separately to the beverage canner.

California also has one of the most advanced aluminum can recycling operations in the nation. Three companies maintain empty can collection centers in some 40 locations throughout the state. Last year, these companies reclaimed about 550 million aluminum cans and paid over $2.5 million for the returned cans. In 1974, these reclamation centers employed 150 persons with a payroll of over $1 million and had $2 million invested in plant and equipment. Currently, the centers pay 15 cents per pound for empty, crushed cans. The operation has been expanding, as the price of scrap aluminum increases with the price of aluminum ingot.

In addition to conserving the restricted supply of bauxite, can recycling also conserves energy, as recycling of scrap aluminum requires only about five percent of the energy needed for extracting aluminum from bauxite.

Steel Can Manufacturers

In 1973 three can companies produced about 1.8 billion steel carbonated beverage containers, valued at $101 million. These companies operate 18 plants in California located in or near the major metropolitan areas. The carbonated beverage cans represent about 50 percent of the industry's total can production. Unlike the aluminum can industry, the steel can industry also produces containers for food and other miscellaneous products. The beverage-can related portion of the industry has a total of $133 million in investments, employs 2,576 persons, and spends $87 million annually for raw materials.

The manufacturing process entails assembly-line production of a three-piece can, made of either chemically treated steel or tin plated steel. The can-ends are shipped separately to the beverage canner.

Data Collection and Estimating Methodology

Both steel and aluminum can manufacturers were contacted individually, as well as through their respective trade associations for basic economic data, including sales, unit costs, investment, employment and profit margins. In addition, our questionnaire invited the companies to indicate their estimates of the first-year impact of the bill on their respective operations.

We received industry-wide information on current sales, investments and employment in California, but no information on production costs, unit labor costs or profit margins. Indications of the bill's potential first-year impact for the steel can manufacturers were provided in summary form, but contained little supportive data.

As a consequence, our estimates are based only partially on industry-furnished employment and other cost factors, and rely extensively on comparable data from other studies.

Economic Impact

Sales Impact. Banning of the easy-open, "flip-top" can, combined with the mandatory deposit will result in a shift in the container-mix to refillable bottles and may reduce significantly the demand for cans. As discussed earlier, we believe that the can share of the market will not be eliminated, and that the convenience and other advantages of the can to both industry and the consumer will lead to the retention of a substantial portion of the market by the can. Our estimates of the remaining can share in the market cover a wide range of possibilities. These estimates, together with the corresponding change in sales dollar volume are shown below:

	Case I Minor Impact	Case II Moderate Impact	Case III Major Impact
Cans as Percent of Total Packaged Sales:			
Beer	55%	40%	25%
Soft Drink	35	25	15
Change in Can Industry Sales Volume (Millions of Dollars)	$-118	$-204	$-283
Percent Change	-30%	-52%	-72%

Under even the moderate impact case, can manufacturers would have to make drastic economic adjustments. They would have to find markets for other product lines within the state, or markets outside California. Consolidation of operations could take place and plant closures could occur under the most severe cases.

Steel beverage-can manufacturers may be able to shift to other product lines to mitigate the impact of the bill, but producers of aluminum cans currently have no in-state alternatives to the beverage can market. Consequently, their plants may have to be shut down, unless economically reliable alternative markets can be found outside California.

Employment and Payrolls. Loss of direct production jobs are estimated to occur in proportion to the decline in sales volume. Our estimates of the reductions in employment and payrolls are shown below:

	Case I Minor Impact	Case II Moderate Impact	Case III Major Impact
Effect on Employment (Number of Man-Years)	-1,582	-2,743	-3,799
Effect on Payrolls (Millions of Dollars)	$-19.0	$-32.9	$-45.6

Net Income Before Taxes. As in the case of other industries, our estimates of the loss of income are based on the industry average operating income as a percent of sales. These estimates are as follows:

	(Dollars in Millions)		
	Case I Minor Impact	Case II Moderate Impact	Case III Major Impact
Reduction in Sales Volume	$118	$204	$283
Reduction in Net Profits Before Taxes	$14.8	$25.5	$35.4

General. As discussed in the section on glass bottle producers, the impact estimates presented here are calculated to reflect the total impact of changes in beer and soft drink consumption in California, and not just the effect on California can manufacturers. As pointed out previously, slightly over 60 percent of the beer consumed in the state is produced outside California, and a relatively larger percent of out-of-state production is in cans. One major out-of-state producer manufactures its own cans. Of the total impact on can manufacturing, approximately 60 percent would be related to beverage production in California, if no change in market shares is assumed.

SECTION G

RETAILERS

Summary of Economic Impact

Enactment of AB 594 is expected to have the following impact on retailers. The range of values in each case represents the values associated with the "minor impact" (Case I) and "major impact" (Case III) estimates of sales volume loss and container-mix change as described in Section A of this chapter.

(1) Packaged Beer and Soft Drink Sales Volume. A decline of 260 million (3%) to 1,210 million (13%) 12-ounce units from base-year sales volume, and a decrease of $121 million (7%) to $391 million (22%) in dollar sales volume.

(2) Employment. An increase of 1,153 to 2,641 jobs, primarily of the warehousing and helper variety. Payroll costs would increase by $9 million to $21 million.

(3) Investments. Increase of $2 million to $4 million for container-storage and handling equipment.

(4) Net Profits Before Taxes. Decline of $17 million to $36 million.

Industry Profile

In California, "home consumption" retail outlets for beer and soft drinks consist of some 11,000 stores, including supermarkets, grocery and convenience stores. In size, they range from the small "mom and pop" grocery stores to giant supermarket chains. The amount of food and other products they sell each year is enormous both in volume and value, and carbonated beverages represent only a small portion of the total sales.

Because of insufficient industry-wide records, the volume and value of the carbonated beverage-share of total retail food sales cannot be accurately determined.

"On premise" retail outlets for soft drinks and beer include restaurants and bars, and soft drinks are also widely sold through vending machines. Of total packaged soft drink sales, approximately 73 percent are made through the home consumption outlets, eight percent through restaurants and bars and 19 percent through vending machines. Similar data for beer consumption is not available.

Data Collection and Estimating Methodology

Consultation with representatives of the retail grocers industry indicated that basic data would be difficult to obtain from the records of retail grocery stores. No specific records are maintained, for example, of time spent handling returned beverage bottles. Problems also exist with respect to sales data. Franchise brand soft drinks and beer are usually delivered and even stocked on the shelves by the distributors, thus bypassing the larger stores computerized stock control and accounting systems. Consequently, detailed data on sales of beverages by brand or container type are not accumulated.

With assistance from the California Grocers' Association, we prepared a brief questionnaire designed to yield as much data as possible within the limitations of the grocers record-keeping and accounting practices. Estimates were requested in areas where we had been advised that actual data were probably not available.

The questionnaire was sent to 435 of the association's 5,600 members. This sample was representative both from the geographic and store-size standpoint. In addition, all supermarket members of the California Retailers' Association were contacted through that organization to ensure their participation. As a result, the sample covered by the questionnaire represented over 65 percent of the total beverage sales through "home consumption" retail outlets.

Approximately 10 percent of the questionnaires were returned in various stages of completion. Generally, they contained information on current container-mix and markups, and some estimates of the potential impact on employment and investments, but very little actual data on sales volume, handling costs, and empty container return rates. The responses also contained some general remarks on AB 594 and comments on specific problems that retailers would face under the bill. Representatives of both the soft drink and retailers associations advised us that there were no sources of statewide information on vending machine sales and no attempt was made to separately estimate the impact on this type of outlet.

Our impact analysis is based partially on data obtained from our survey, supplemented with pertinent data from other studies./8

Sales Volume. Sales by retail outlets would be adversely affected by both the decline in volume and the shift to the lower price returnable bottle. Our estimates of the changes in total retail sales are as follows.

/8 Includes the MRI, EPA, ADS and New York State reports, and Alpha Beta Markets, Inc., Bottle Survey '71; A California Supermarket Report on the Cost of Handling Returnable Soft Drink Bottles, La Habra, California, 1971.

Sales in Millions of Dollars	Case I Minor Impact	Case II Moderate Impact	Case III Major Impact
Beer	$ -24	$ -89	$-151
Soft Drinks	-97	-171	-240
Total	$-121	$-260	$-391
Percent of Total Beer and Soft Drink Sales	-6.9%	-14.9%	-22.4%

Employment and Payrolls. Retail outlets would be faced with increased employment and additional labor costs for handling empty beverage containers. Estimating the number of additional employees required is complicated by the fact that additional man-hours required to handle returned containers do not necessarily translate into new jobs, as illustrated by the Oregon experience. Many retailers in that state utilized their existing labor force to handle the increased volume of returned containers, without adding new employees. Our estimates, shown below, represent the total number of additional man-years required; or equivalent number of employees.

	Case I Minor Impact	Case II Moderate Impact	Case III Major Impact
Total Man-Years	1,153	1,946	2,641
Total Increase in Payrolls (Millions of Dollars)	$9.2	$15.6	$21.1

Investments

Retailers would incur increased investment costs for additional storage space and equipment, such as sorting bins, racks and transportation equipment for the handling and storage of the empty beverage containers returned. There might be additional costs connected with potential sanitation problems caused by the returned containers.

Grocers responding to our questionnaire were particularly concerned about both the potential sanitation problems and the security problem of safekeeping the empty containers until pick up by the distributors. In addition, many of them reported that they did not have the additional space to handle and store the returned containers and could not acquire additional land for expansion of their existing storage space.

Additional investments of $1,000 per million 12-ounce units are estimated for retailers, resulting in total investment requirements of $1.9 million for Case I, $3.2 million for Case II, and $4.4 million for Case III.

Net Profits Before Taxes. Lower dollar sales volumes and increased labor costs will impact adversely on retailers profits. Additional overhead expenses related to expanded storage requirements would contribute to the loss of income. Our estimates of the profit impact are shown below:

	Case I Minor Impact	Case II Moderate Impact	Case III Major Impact
Reduction in Income Due to Change in Sales Volume	$4.2	$9.1	$13.7
Increase in Expenses:			
Labor	$ 9.2	$15.6	$21.1
Overhead	.4	.6	.9
Total Decline in Profits	$13.8	$25.3	$35.7

CHAPTER IV

ECONOMIC IMPACT OF AB 594 ON LITTER CONTROL

Introduction

Chapter II described the growing concerns of society with the problems of litter in general and beverage containers in particular. Additionally the Oregon experience dealing with the change in litter in that state, was discussed on pages 23 to 24.

Littering is the careless and improper disposal of consumer solid waste. Such activity is not unique to any state, age group, sex, or income level, nor can the control of litter be concerned only with beverage containers. A recent study/9 completed by the Institute for Applied Research (IAR) represents the most comprehensive study of the California litter situation yet made. This report was presented to the Assembly Committee on Resources and Land Use in May 1975. This study reported that on a piece count basis beer and beverage cans and bottles comprise about nine percent of California litter and crowns (metal caps), pull-tabs and container carriers comprise about 13 percent./10

The report to the Oregon Legislature made by Applied Decision Systems (ADS) concurred in the significance of piece count/11 as a meaningful measure of litter but implied only if the technique for counting such material is uniformly applied. During 1973-74, the California Department of Transportation spent about $3 million for litter pick up.

/9 Syrek, Dan; California Litter, A Comprehensive Analysis and Plan for Abatement, a report to the California State Assembly Committee on Resources and Land Use, May 1975.
/10 Syrek, op. cit., pg. 219.
/11 ADS Report, op.cit.

This chapter discusses the potential impact of AB 594 on litter collection and disposal.

Litter Collection

In California, litter collection is normally performed by state or local governments and independent volunteers such as church groups, the Boy Scouts and similar organizations. Based upon our discussions with state and local highway maintenance organizations and the State Department of Parks and Recreation, we do not believe that the probable decrease in highway litter under AB 594 would result in the layoff of any paid personnel, or a measurable decrease in equipment usage or gasoline consumption associated with highway litter pick up activity. (It is noteworthy that the funds allocated for litter control in Oregon did not decrease following the implementation of their container legislation despite a reduction in the number of containers.)

Litter Disposal

At present, there are no major resource recovery operations in the state with a sophisticated "front-end" separation system for segregating various materials (several are being planned). Therefore, beverage containers in municipal refuse as well as in litter gathered by any person or organization involve some disposal cost at landfills. Considerable discussion of disposal costs is included in the beverage container study conducted by the Research Triangle Institute (RTI) for EPA./12

We anticipate that the material recovery programs being contemplated by the State Solid Waste Management Board and the Energy and Resource

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/12 Bingham, T.H., and Mulligan, P.T., op. cit.

Recovery Commission for implementation by local government at various population centers will be undertaken within a few years. Recovery facilities will minimize the cost of handling and separating beverage containers from the rest of the refuse prior to disposal, thereby reducing the landfill cost attributed to such containers. If material recovery plants are not created, and current litter practices continue, disposal costs will continue to be incurred. The costs in California could be approximately $2 million for disposal of the 220 million beer and beverage containers littered annually using an average disposal cost of $3 per ton.

APPENDIX A

SUPPLEMENTARY DATA FROM OTHER STUDIES

New York

The potential economic impacts were estimated for three possible assumptions or scenarios for changes in soft drink container-mix as follows:

1. Scenario 1 - Assumes a strong shift to refillable bottles.
2. Scenario 2 - Envisions a more limited shift to returnable bottles.
3. Scenario 3 - Postulates a strong shift to aluminum cans.

The actual (1973) and the projected package-mix for beer and soft drink sales under the three scenarios are detailed in Table A-1.

Table A-1

CURRENT AND ANTICIPATED PACKAGING-MIX
UNDER DIFFERENT SCENARIOS FOR THE STATE OF NEW YORK

Container-Types	Base-Year (Actual 1973)	Scenario 1	Scenario 2	Scenario 3
Beer				
Refillable Bottles	13%	90%	70%	35%
Nonrefillable Bottles	43	0	10	0
Cans	44	10	20	65
Totals	100%	100%	100%	100%
Soft Drinks				
Refillable Bottles	9%	80%	60%	30%
Nonrefillable Bottles	57	0	10	0
Cans	34	20	30	70
Totals	100%	100%	100%	100%

Source: New York Task Force on Critical Problems, op. cit., p. 51.

Based on a survey of New York's carbonated beverage consumers and on the Oregon experience, the study predicts that of the three possible changes in packaging mix, Scenario 1 (a strong shift to refillable bottles) is most likely to occur under a mandatory deposit system. Table A-2 sets forth the estimates of economic impact for each of the scenarios.

TABLE A-2

SUMMARY OF POTENTIAL ECONOMIC IMPACTS OF A MANDATORY DEPOSIT SYSTEM ON AFFECTED INDUSTRIES IN THE STATE OF NEW YORK [a]

	Affected Industries						
Selected Impact Areas	Soft Drink Manufacturers	Brewers	Beer Wholesalers	Can Manufacturers	Glass Bottle Manufacturers	Retailers	Net Total Impact
			Scenario 1				
Employment (No. of Jobs)	+2,766	+90	+512	-782	-437	+1,858	+4,007
Payroll Change (Millions)	$+30.0	$+1.0	$+6.0	$-10.6	$-5.0	$+13.4	$+34.8
New Investments (Millions)	$+132.0	$+28.4	$+11.3	---	--- [b]	$+4.6	$+176.3
Production/Distribution Costs (Millions)	$-55.6	$-38.0	$+10.0	---	--- [b]	$+35.7	$-47.9
			Scenario 2				
Employment (No. of Jobs)	+1,877	+65	+432	-708	-437	+1,858	+3,087
Payroll Change (Millions)	$+20.4	$+.8	$+5.0	$-9.6	$-5.0	$+13.4	$+25.0
New Investments (Millions)	$+72.4	$+23.7	$+8.2	---	--- [b]	$+4.6	$+108.9
Production/Distribution Costs (Millions)	$-40.0	$-28.0	$+7.8	---	--- [b]	$+35.7	$-24.5
			Scenario 3				
Employment (No. of Jobs)	-976	-57	-61	--- [c]	-737	+1,858	+27
Payroll Change (Millions)	$-10.6	$-.7	$-.8	--- [c]	$- 8.4	$+13.4	$-7.1
New Investments (Millions)	$+13.8	$+5.1	---	--- [c]	---	$+4.6	$+23.5
Production/Distribution Costs (Millions)	$-15.6	$-4.1	$-.9	--- [c]	---	$+35.7	$+15.1

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[a] Includes only impacts on affected industries located within New York State.

[b] Only one of the three currently producing plants indicated that it would convert to returnable bottles at minimal new investment cost. The others indicated that they would transfer production to out-of-state plants.

[c] Additional can production would be handled by existing plants without significant change in existing levels of employment, investments or production costs.

Source: New York Task Force on Critical Problems, op. cit., Appendix I, pp.1-1 through 8-12.

National Studies

Estimates of the national economic impact of alternative policies for beverage container litter control are set forth in Tables A-3 and A-4. These studies are described in Chapter II.

TABLE A-3

SUMMARY OF ESTIMATED NATIONAL ECONOMIC IMPACT OF BAN ON NONREFILLABLE BEVERAGE CONTAINERS

Industry:	Employment (Thousands)	Employment Costs (Millions)	Investment (Millions)
Soft Drink Industry	+10.0	$ +91	$ 299
Brewers	+12.4	+133	464
Beer Distributors	+18.7	+169	276
Can Manufacturers	-27.7	-292	---
Can Stock Manufacturers	-30.2	-323	---
Glass Container Manufacturers	-8.2	-95	---
Retailers	+15.1	+69	22
Net Total	-9.9	$-248	$1,061

Source: Maillie, Jeff, The National Economic Impact of a Ban on Nonrefillable Beverage Containers, Midwest Research Institute, Kansas City, Mo., 1971, p. 23.

TABLE A-4

SUMMARY OF ESTIMATED NATIONAL ECONOMIC IMPACT OF MANDATORY DEPOSIT ON BEVERAGE CONTAINERS

Industry:	Employment (Thousands)	Employment Costs (Millions)	Investment (Millions)
Soft Drink	+12.6	$ +82	$ 345
Brewers	+3.2	+32	501
Beer Distributors	+14.6	+115	298
Can Manufacturers	-29.5	-260	---
Can Stock Manufacturers	-15.3	-145	---
Glass Container Manufacturers	-15.7	-114	---
Retailers	+30.4	+176	24
Net Total	+.3	$-114	$1,168

Source: Bingham, T.H. and Mulligan, P.F., The Beverage Container Problem, Analysis and Recommendations, Research Triangle Institute, Washington, D.C., 1972, pp. 59-62.

APPENDIX B

AN ECONOMETRIC ANALYSIS OF BEER AND SOFT DRINK DEMAND

SUMMARY RESULTS

The Problem

Spokesmen for both the beer and soft drink manufacturers argue that proposals to abolish, tax or require deposits on convenience beverage packaging would substantially reduce sales volume. Soft drink manufacturers claim that AB 594 would reduce the extent of convenience packaging by some 50 percent and cause a sales volume decline of 27 percent. Beer manufacturers have quoted declines of 15 percent to 25 percent. The support for the estimates of the decline in soft drink consumption is entirely qualitative. In the case of beer, we feel that the statistical methodology behind the more pessimistic conclusions has been incomplete.

For example, per capita beer consumption fell from 1947 to 1958, then rose to the present. Because (1) per capita real disposable income rose over the entire period and (2) convenience beer packaging first emerged in the mid-1950's, a leading California brewery contends that convenience packaging caused a fundamental structural change in beer demand, changing beer from an "inferior" to "superior" good. It then (1) states that the abolishment of convenience packaging would return the market to its earlier demand structure (2) extrapolates the 1947-58 downward sloping regression line relating income and beer consumption in the 1970's, and (3) concludes that per capita consumption would decline by almost 25 percent. These conclusions are unwarranted and misleading, because not all variables influencing beer consumption have been taken into account and the question of structural change has not been properly addressed.

Our own econometric analysis, while certainly not exhaustive, suggests that a decline in sales volume of 10 percent for soft drinks and somewhat less for beer would be consistent with the estimated packaging change.

Procedure

Available data permits the estimation of demand relationships for beer and soft drinks for 1953-73. Ordinary least squares multiple regression is used to estimate coefficients and elasticities for demand-determining explanatory variables. A variety of functional specifications are considered, and because multicollinearity is often a serious problem with time series data both simple linear and first difference regressions are examined. Alternative hypotheses concerning future beverage price changes and packaging mixes are then applied to the computed demand elasticities in order to project reductions in sales volumes for beer and soft drinks under AB 594.

The Demand for Beer

We hypothesize that per capita beer consumption is influenced by per capita real disposable income, price of beer, price of "other" commodities (including alcoholic beverages, nonalcoholic beverages and non-beverage goods), age distribution of the population and the type of packaging used (where consumers view packaging as a determinate of product "quality"). The following data and variables are considered:

Dependent variable

CPC = per capita beer consumption in gallons, as published in the 1974 Brewers Almanac .

Independent variables

SHARE1 = percent of population aged 20-24
SHARE2 = percent of population aged 20-44
INC = per capita real disposable income (1958=100)
FOOD = CPI food price index (1967=100)
CPI = overall CPI (1967=100)
NAL = CPI index for nonalcoholic beverages (1967=100)

COLA = CPI for carbonated cola drinks (1967 100)
AL1 = CPI for alcoholic beverages (1967=100)
BEER = CPI for beer (1967=100)
WISK = CPI for whiskey (1967=100)
FRUIT = CPI for carbonated fruit drinks (1967=100)
WINE = CPI for dessert and table wines (1967=100)
BEV = wholesale beverage price index (1967=100)
TIME1 = linear time trend
TIME2 = nonlinear time trend
PACKB = percent of beer sold in convenience packaging form
BEERD = beer CPI deflated by overall CPI
COLAD = cola CPI deflated by overall CPI

Estimation results: Beer demand from 1953-73 is best explained by beer prices (BEER or BEERD), carbonated cola prices (COLA or COLAD), income (INC), the proportion of the population aged 20-44 (SHARE2), and the share of convenience packaging (PACKB). Table B-2 presents preferred equation forms and corresponding demand elasticities. Coefficient significance is generally quite high. We note the following:

(1) Demand elasticities for beer are in the range of +0.26 to +0.30 for income, -0.50 for beer prices, and +0.25 to +0.40 for carbonated cola soft drink prices. Beer is thus both income and price inelastic and is a "normal" good. A statistically significant but quantitatively mild substitution effect from soft drinks to beer is evidenced by the +0.25 to +0.40 cross elasticity of demand estimate.

(2) One measure of how important each explanatory variable is in determining the level of beer consumption (as opposed to changes in this level) is to express the contribution of each variable to the value of the dependent variable as a percent of the latter. This involves dividing the product between a variable's mean value and its estimated coefficient, by the mean dependent variable value. For Case D in Table B-2 the absolute values of these percentages are 150 percent for SHARE2, 45 percent for BEERD, 26 percent for INC, 25 percent for COLAD and 3.3 percent for PACKB.

(3) The 20-24 age group exerts a strong, independent influence on beer demand. However, the demand elasticity for the entire 20-44 age group is more significant. This agrees with marketing surveys which show beer demand to be spread over a wide range of ages. A rise of one percent in the population proportion 20-44 will raise beer consumption by roughly 1.5 percent per capita.

(4) Carbonated cola beverages exhibit the strongest and most statistically significant cross elasticity of demand for beer consumption (+0.25 to +0.40). A somewhat higher result of +0.49 occurs for carbonated fruit beverages; however, coefficient significance is below 80 percent and this price index is only available after 1963. The insignificant elasticity of -.079 for nonalcoholic beverage prices collectively indicates that not all such beverages are beer substitutes (milk, tea, coffee, ...), although carbonated fruit drinks certainly are.

(5) Concerning alcoholic beverages, wine prices produce a very mild substitution effect for 1964-73 with a cross elasticity of +0.12 (though not significant at 80 percent). Whiskey price coefficients are both insignificant and of unexpected sign. The elasticity associated with all alcoholic beverage prices ranges from +0.54 to +0.84; however, coefficient "t" values fall below unity while beer price coefficients inflate and become insignificant. We conclude that the substitution effects of alternative alcoholic beverages on beer consumption are quite mild and not statistically impressive. We also find no substitution between beer and food, and only limited direct substitution between beer and other consumer goods (a cross elasticity of +.05 to +.16, although statistically insignificant). The relatively low "own price" beer demand elasticity is suggestive of a

commodity with relatively weak substitution characteristics. Our statistical analysis supports this view, as only carbonated cola drinks produce cross elasticities which are statistically impressive.

(6) The estimated income elasticity of roughly +0.30 refutes industry suggestions that beer was an inferior good prior to 1958. While the beer price index is not available prior to 1953, we note that the negative relationship between beer consumption and income from 1947-58 disappears when a wholesale beverage price index is included. The industry's method of projecting sales losses in the absence of convenience packaging is thus inappropriate.

(7) All else constant, the 25 percent sales drop suggested by industry sources would require a rise in beer prices of 45 percent to 56 percent based on cases C and D. All else constant, a decline of 50 percent in the share of convenience packaging would reduce sales by only two percent to three percent based on cases C and D. An increase of 10 percent in beer prices and the 50 percent decline in convenience packaging, all else constant, would reduce beer sales by seven percent to nine percent, using cases C and D. The industry's estimate of sales reductions again appears misleading.

(8) Industry sources claim that a major structural change in demand occurred after 1958 due to convenience packaging. We find no strong support for this conclusion. Reestimations of the beer demand equations for 1953-73 excluding the packaging variable but including (a) a post-1958 dummy and (b) a post-1965 dummy, yield very insignificant dummy coefficients which are not always positive. The same result emerges when the entire 1947-73 period is examined using the wholesale beverage price index as a proxy for

beer prices. We also question the industry's contention that a significant change in demand structure due to convenience packaging could have emerged so abruptly as the late 1950's. Convenience packaging did not begin until the mid-1950's, and major shifts in packaging mix appear to have taken some time. In soft drinks, for example, returnable bottles held 95 percent of the market in 1960 and 84 percent in 1965, as opposed to only 47 percent in 1970. Despite this, post-1958 and post-1965 dummies in the beer equations produce insignificant and, at times, negative coefficients. We also find that when estimating preferred linear regressions for subperiods before and after 1958-59 (and excluding the packaging mix variable), the Chow test procedure rejects at the 99 percent confidence level the hypothesis that all coefficients as a group have changed between periods. We conclude that, although convenience packaging has undoubtedly caused some structural change in beer demand, its magnitude and statistical significance as claimed by the industry is an exaggeration. We also note from Table B-2 that although the packaging mix variable (PACKB) contributes positively to explaining beer consumption, its coefficient significance lies below 95 percent and its elasticity (+0.030 to +0.033) is quite low.

The Demand for Soft Drinks

We hypothesize soft drink consumption to depend upon per capita real disposable income, soft drink prices, prices of "other" commodities (including nonalcoholic beverages, selected alcoholic beverages such as beer, and non-beverage goods), age distribution of the population and the type of packaging used (which, as in the case of beer, consumers view as a determinate of product "quality"). The dependent variable is per capita soft drink consumption measured in eight ounce bottles (SOFT). Explanatory variables include those used above to examine beer demand, plus the percent of soft drinks sold in convenience packaging form (PACKS), substitute beverage price indices for such commodities as tea and powdered and liquid milk, and the percentage of the population falling into the following age brackets: 5-15 years; 16-19 years; 20-24 years; under 24 years; 5-19 years; 5-24 years; and 20-44 years. Dummy variables for post-1958, post-1965 and post-1968 are also used to test for sudden changes in demand structure caused by convenience packaging.

Estimation results: Soft drink demand from 1953-73 is best explained by soft drink prices (COLA or COLAD), income (INC), beer prices (BEER or BEERD), the share of convenience packaging (PACKS), and a non-linear time trend (TIME2). Table B-3 presents selected equation forms and corresponding demand elasticities. As with the beer demand estimations, coefficient performance is quite impressive. We note the following:

(1) It is often assumed that soft drink consumption is concentrated among the very young. However, we do not find a statistically significant positive coefficient for any of the age variables considered. This suggests that soft drink consumption is broadly spread over all age groups.

(2) Insignificant dummy variable coefficients estimated in the absence of the packaging mix variable suggest that a sudden structural shift in demand did not occur in 1958, 1965 or 1968. The packaging mix variable, however, is consistently significant at above 99 percent, with an elasticity in the range of .10 to .12 (contrasted with a corresponding elasticity of 0.03 for beer). Convenience packaging has been a statistically significant influence on soft drink consumption growth, and to a greater magnitude than in the case of beer.

(3) Soft drink consumption is a "normal" good with positive income elasticity of 0.75, statistically significant at 99 percent. Thus, although soft drinks are income inelastic, their demand is somewhat more income elastic than that for beer.

(4) There is no strong evidence that other nonalcoholic beverages are soft drink substitutes. Cross elasticities of demand are often not significant, and when positive and significant the soft drink price index achieves a significantly wrong sign (as in the case of milk prices). While some evidence of substitutability between fruit drinks and soft drinks exists, the former's price index was not available over a long enough period (i.e., before 1964) to allow for effective analysis.

(5) Substitutability between soft drinks and alcoholic beverages is a result of substitutability between beer and soft drinks. The cross elasticity between beer and soft drinks is in the 0.50 to 0.70 range and is significant at 90 percent confidence. We conclude that beer and soft drinks are substitute beverages. A comparison of cross elasticities between soft drinks and beer using both the soft drink and beer demand functions shows consistency with theoretical expectations. Namely, the substitution from soft drinks into beer is weaker in magnitude than that from beer into soft drinks (although both cross elasticities are statistically significant). Proportionately more beer drinkers will switch to soft drinks than _vice versa_, given relative price changes.

(6) The "own price" demand elasticity for soft drinks is -0.30 to -0.50, and is generally significant at above 98 percent confidence. Soft drink consumption, like that for beer, is price inelastic. Cases C and D suggest that these elasticities are of roughly comparable magnitudes (see corresponding cases in Table B-2).

(7) When soft drink prices are not deflated by more inclusive price indices and beer prices are excluded, positive cross elasticities at the 95 percent confidence level are noted for food (0.21) and "all other" consumer goods (0.30 to 0.50). Consumers probably substitute between soft drinks and non-beverage commodities.

(8) The overall performance of cases C and D with the nonlinear time trend incorporated suggests that soft drink demand has experienced expansion independent of economic and demographic factors. The probable cause is an autonomous shift in consumer beverage tastes and consumption habits. From 1962-73, soft drink per capita rose relative to all other beverages (including coffee, milk, beer, tea, juices, distilled spirits and wine).

(9) All else constant, the 27 percent decline in sales volume forecast by industry sources would require a rise in soft drink prices of 52 percent to 77 percent based on cases C and D. All else constant, a decline of 50 percent in the share of convenience packaging of soft drinks would reduce quantity sold for cases C and D by only nine percent to 10 percent. An increase of 10 percent in soft drink prices and the 50 percent decline in convenience packaging, all else constant, would reduce soft drink sales by 12 percent to 15 percent. If both beer and soft drink prices rose 10 percent and the packaging mix for soft drinks fell to 50 percent, sales would fall by six percent to 10 percent. Computations of anticipated sales losses for both beer and soft drinks under assumptions relevant to AB 594 are as follows.

Limitations of the Analysis

First, interpretation of these econometric results requires recognition that possible biases may exist due to the presence of multicollinearity in the time series data. For example, reestimation of soft drink equations using first differences reduces the effect of packaging by about one-third. To the extent that per capita dependent variable figures have been used, multicollinearity is less than what it might have been otherwise.

Second, our treatment of the effect of the convenience packaging mix is somewhat *ad hoc*. One objection to the direct inclusion of this variable as an explanatory variable is that packaging mix is determined by both supply and demand conditions. The proper theoretical approaches to this problem might include: (1) the disaggregation of the soft drink market into convenience and non-convenience packaging segments and estimation of demand functions for each (as well as for individual soft drink products such as "colas" versus "uncolas"); and (2) adjustment for the effect of packaging on product "quality" by construction of a hedonic price index. However, because available data did not allow these refinements, we have estimated a somewhat *ad hoc* reduced form equation for both commodities.

Despite these shortcomings, the estimations appear to be quite acceptable for forecasting and prediction purposes, and yield results which are consistent with theoretical expectations.

Predictions of Sales Declines Under AB 594

A 5-cent deposit on convenience beverage packaging products is assumed to raise soft drink prices by 18.6 percent and beer prices by 17.4 percent (adjusting "average" prices for the existing packaging mix). Three cases are considered for each beverage concerning declines in the packaging share that accompany the price changes. The percentage change in sales volume from the 1973 level is then computed (the 1974 data is not used because per capita beverage consumption data is not yet available). Table B-1 presents the packaging mix assumptions and corresponding projected changes in per capita consumption of soft drinks and beer. Table B-4 presents detailed information on sales effects on each beverage due to the price change in soft drinks, the price change in beer, and the packaging mix change.

TABLE B-1

ASSUMPTIONS AND RESULTS CONCERNING PRICE AND PACKAGING MIX CHANGES

	Case I	Case II	Case III
(1) Soft drinks			
Price change = 18.6%			
% Convenience packed in 1973	61	61	61
% Projected after AB 594	45	30	15
% Change	-16	-31	-46
% Change in sales			
a. Case C, Table B-3	-5.93%	-11.02%	-16.11%
b. Case D, Table B-3	+0.40%	-4.06%	-8.51%
(2) Beer			
Price change = 17.4%			
% Convenience packed in 1973	83	83	83
% Projected after AB 594	55	40	25
% Change	-28	-43	-58
% Change in sales			
a. Case C, Table B-2	-3.20%	-3.87%	-4.55%
b. Case D, Table B-2	-4.86%	-5.76%	-6.66%

Conclusions: For purposes of comparison, case C for each table should be compared and case D of each table should be compared. Soft drink sales will most likely be damaged more than beer sales. However, industry estimates of sales reductions for beer (-25%) and soft drinks (-27%) are far in excess of our projections (less than -6% and -11% for Case II, respectively).

TABLE B-2

REGRESSION RESULTS FOR BEER DEMAND[a]

Variable	Case A	Case B[b]	Case C	Case D[b]	Variable Mean
CPC (dependent variable)					165.33
Constant	-53.89 (2.53)	-78.11 (1.87)	-90.34 (1.96)	-96.41 (2.27)	1.0000
SHARE2	.6589 (15.55)	.7009 (10.97)	.7090 (10.07)	.7566 (10.32)	327.00
INC	.0217 (3.33)	.0209 (3.24)	.0196 (2.82)	.0196 (3.11)	2168.9
BEER or BEERD	-.1356 (3.12)	-88.78 (3.50)	-.0936 (1.46)	-73.30 (2.72)	979.10 1.0205[b]
COLA or COLAD	.0987 (4.29)	64.47 (3.01)	.0760 (10.07)	44.51 (1.77)	906.00 0.9232[b]
PACKB			.0913 (.89)	.1212 (1.42)	44.760
Observations	21	21	21	21	
R^2	.9910	.9900	.9914	.9911	
SSR	45.51	50.56	43.21	44.57	
D.W.	2.06	1.90	2.16	2.13	

Elasticities:	Case A	Case B	Case C	Case D
INC	.29	.28	.26	.26
COLA or COLAD	.54	.36	.42	.25
BEER or BEERD	-.81	-.55	-.56	-.45

[a] All specifications are linear. Figures in parentheses represent "t" statistics. Elasticities are evaluated at variable mean values.

[b] BEERD and COLAD used in place of BEER and COLA.

TABLE B-3

REGRESSION RESULTS FOR SOFT DRINK DEMAND[a]

Variable	Case A	Case B[b]	Case C	Case D[b]	Variable Mean
SOFT (dependent variable)					2610.0
Constant	-1912 (2.46)	-56.95 (.06)	-112 (.09)	-935 (1.07)	1.0000
COLA or COLAD	-.8534 (1.73)	-745.7 (2.67)	-1.5044 (2.64)	-984.8 (3.73)	906.00 .9232[b]
BEER or BEERD	2.0133 (1.98)	-132.4 (.20)	1.4081 (1.42)	1706.3 (1.78)	979.10 1.0205[b]
INC	1.3888 (6.71)	1.4642 (7.84	.9066 (2.86)	.9208 (3.33)	2168.9
PACKS	14.6757 (5.02)	14.8319 (6.00)	14.5822 (5.38)	12.7565 (5.49)	21.240
TIME2			2.7330 (1.91)	2.8182 (2.43)	157.60
Observations	21	21	21	21	
R^2	.997	.998	.998	.998	
SSR	41668	35742	33508	25636	
D.W.	1.52	1.81	2.23	2.53	

Elasticities:

	Case A	Case B	Case C	Case D
INC	1.16	1.22	.75	.77
COLA or COLD	-.30	-.26	-.52	-.35
BEER or BEERD	.75	-.05	.53	.67

[a] All specifications are linear. Figures in parentheses represent "t" statistics. Elasticities are evaluated at variable mean values.

[b] BEERD and COLAD used in place of BEER and COLA.

TABLE B-4

EFFECTS OF BEVERAGE PRICE CHANGES AND ALTERNATIVE PACKAGING MIX CHANGES ON BEER AND SOFT DRINK SALES[a]

1. Effect on beer using Case D, Table B-2:

	Case I	Case II	Case III
Effect of cola price	4.65	4.65	4.65
Effect of beer price	-7.83	-7.83	-7.83
Effect of packaging	-1.68	-2.58	-3.48
Net Effect	-4.86	-5.76	-6.66

2. Effect on beer using Case C, Table B-2:

	Case I	Case II	Case III
Effect of cola price	7.81	7.81	7.81
Effect of beer price	-9.74	-9.74	-9.74
Effect of packaging	-1.27	-1.94	-2.62
Net Effect	-3.20	-3.87	-4.55

3. Effect on soft drinks using Case D, Table B-3:

	Case I	Case II	Case III
Effect of cola price	-6.51	-6.51	-6.51
Effect of beer price	11.66	11.66	11.66
Effect of packaging	-4.75	-9.21	-13.66
Net Effect	0.40	-4.06	-8.51

4. Effect on soft drinks using Case C, Table B-3:

	Case I	Case II	Case III
Effect of cola price	-9.69	-9.69	-9.69
Effect of beer price	9.19	9.19	9.19
Effect of packaging	-5.43	-10.52	-15.61
Net Effect	-5.93	-11.02	-16.11

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[a] All figures represent percentages. For details on price change and package mix change assumptions, see text.

APPENDIX C

CALCULATIONS OF ECONOMIC IMPACT

SECTION 1

SOFT DRINK INDUSTRY

1. Sales Volume. From data supplied by the California-Nevada Soft Drink Association, we calculated the 1974 sales volume in millions of 12-ounce equivalent containers and computed the changes in sales volume for the three cases or scenarios, based on our estimated changes in consumption and packaging mix, as follows:

TABLE C-1

ESTIMATED SALES VOLUME AND PACKAGE-MIX
(In Millions of Equivalent 12-Ounce Containers)

	Base-Year		Case I Minor Impact		Case II Moderate Impact		Case III Major Impact	
Container Type	Percent of Total Sales	Volume	Percent of Total Sales	Volume	Percent of Total Sales	Volume	Percent of Total Sales	Volume
Refillable Bottles	31%	1,612	55%	2,717	70%	3,276	85%	3,757
Nonrefillable Bottles	16	832	10	494	5	234	-0-	-0-
Cans	53	2,756	35	1,729	25	1,170	15	663
Totals	100%	5,200	100%	4,940	100%	4,680	100%	4,420

2. Sales Value. The industry reported the value of actual base-year (1974) soft drink sales in California as $720 million. It also found that the average revenue per unit from soft drinks in refillable containers is 25 percent less than the average revenue from soft drinks in nonrefillable containers. On basis of this information, we calculated the potential impact on sales value under each case as follows:

Volume change = base-year sales value x percent change in volume/100.

Mix change = base-year sales value x (100 - percent change in volume)/100 x change in market percent of refillable bottles/100 x percent price differential/100.

		(Millions)
Case I		
Volume change:	$720 x (-.05)	= $-36
Mix change:	$720 x .95 x (.31 - .55) x .25	= $-41
Total change		$-77
Case II		
Volume change:	$720 x (-.10)	= $-72
Mix change:	$720 x .90 x (.31 -.70) x .25	= $-63
Total change		$-135
Case III		
Volume change:	$720 x (-.15)	= $-108
Mix change:	$720 X .85 X (.31 - .85) x .25	= $ -83
Total change		$-191

3. Employment. The impact on employment would be determined by the changes in total sales volume and in the package-mix. On the basis of employment impact estimates in the Zenith report, we calculated that a decline of one million 12-ounce equivalent containers in total sales volume would reduce production and distribution employment by .95 man-year, and an increase of one million equivalent units in returnable container-share of total sales volume would increase production employment by .20 man-year and distribution employment by .44 man-year. Applying these ratios to the

changes in total sales volume and in the nonrefillable container-share of total sales, as shown in Table C-1, we calculated the impact for each case as follows:

Volume change = man-years per one million total units x change in total units.

Mix change = man-year differential per one million refillable units x change in percent returnable bottles x total production of equivalent 12-ounce units.

			Man-Years	Payroll at $12,000 per Man-Year (Millions)
Case I				
Volume change:	.95(4940 - 5200)	=	-247	
Mix change:				
Warehouse	.44(.55 - .31)4940	=	+521	
Production	.20(.55 - .31)4940	=	+234	
			+508	$+6.1
Case II				
Volume change:	.95(4680 - 5200)	=	-494	
Mix change:				
Warehouse	.44(.70 - .31)4680	=	+803	
Production	.20(.70 - .31)4680	=	+365	
			+674	$+8.1
Case III				
Volume change:	.95(4420 - 5200)	=	-741	
Mix change:		=		
Warehouse	.44(.85 - .31)4420	=	+1050	
Production	.20(.85 - .31)4420	=	+477	
			+786	$+9.4

4. Investments: On basis of data from the soft drink industry, we calculated the ratio of the change in new investment to the change in refillable volume to be $111,000 per million 12-ounce units of refillable bottles.

Applying this ratio to the change in refillable bottle sales volume under each case, as shown in Table 1 of this appendix, we calculated the impact on investments as follows:

Case I refillable bottle volume: 2717
Base-year impact refillable bottle volume: -1612
1105 x $.111 = $+122 million

Case II refillable bottle volume: 3276
Base-year impact refillable bottle volume: -1612
1664 x $.111 = $+184 million

Case III refillable bottle volume: 3757
Base-year impact refillable bottle volume: -1612
2145 X $.111 = $+238 million

5. Net Profits Before Taxes. The income impact is based on (a) Standard and Poor's reported ratios of operating income to sales for soft drink bottles, (b) increased warehousing and distribution labor costs, and (c) increased overhead costs associated with new facilities. Calculations are as follows:

a. Income effect of decline in sales volume = change in sales volume (millions of dollars) x ratio of operating income to sales.

Case I $ 77 x .18 = $13.9 million

Case II $135 x .18 = $24.3 million

Case III $191 x .18 = $34.4 million

b. Increase labor costs = number of additional warehouse and distribution employees x average employment cost per man-year.

Case I   521 x $12,000 = $ 6.3 million

Case II   803 x $12,000 = $ 9.6 million

Case III 1050 x $12,000 = $12.6 million

c. A ratio of the estimated increases in expenditures for depreciation, interest, insurance, property taxes and utilities to the amount of new capital investment was calculated from data in the Zenith report to be 20.5 percent. The increase in other costs was then calculated as follows:

Increase in other costs = new capital investment (millions of dollars) x ratio of expenses to investment:

Case I $122 x .205 = $25.0 million

Case II $184 x .205 = $37.7 million

Case III $238 x .205 = $48.8 million

SECTION 2

BREWERS

1. Sales Volume. In 1974 total beer sales in California amounted to 15.0 million barrels. Assuming that the volume of draught beer would not be affected by the bill, we limited our analysis to the impact on packaged sales only which, in 1974, was 12.9 million barrels, or 86 percent of the total. We converted this volume to millions of 12-ounce equivalent containers and computed changes in the sales volume for the three cases, based on the estimated changes in consumption and container mix (described in Chapter II) as follows:

TABLE C-2

ESTIMATED CHANGES IN PACKAGED BEER SALES VOLUME AND PACKAGE MIX

(In Millions of 12 oz. Containers)

	Base-Year		Case I		Case II		Case III	
Container Type	Percent of Total Sales	Volume	Percent of Total Sales	Volume	Percent of Total Sales	Volume	Percent of Total Sales	Volume
Refillable Bottles	6%	258	25%	1,075	45%	1,838	65%	2,515
Nonrefillable Bottles	22	946	20	860	15	613	10	387
Cans	72	3,095	55	2,364	40	1,633	25	967
Total	100%	4,299	100%	4,299	100%	4,084	100%	3,869
Percent Change from Base-Year				-0-		-5%		-10%

2. Sales Value. The average 1974 California sales price for packaged beer at the brewery level was $43/barrel, according to the U.S. Brewers Association. By comparing 1974 wholesale packaged beer prices in equivalent units,

we determined that the average sales prices for beer in refillable containers is approximately 15 percent below beer in nonrefillable containers. Considering the changes in total sales volume and mix and applying this price differential, we calculated the impact on sales value as follows:

Volume change = base-year sales value (millions of dollars) x percent change in volume/100.

Mix change = base-year sales value x (100 - percent change in volume)/100 x change in market percent of refillable bottles/100 x percent price differential/100.

			(Millions)
Case I			
Volume change:	$559 x 0	=	-0-
Mix change:	$559 x 1.00 x (.06 - .25) x .15	=	$-16
Total			$-16
Case II			
Volume change:	$559 x .05	=	$-28
Mix change:	$559 x .95 x (.06 - .45) x .15	=	$-31
Total			$-59
Case III			
Volume change:	$559 x .10	=	$-56
Mix change:	$559 x .90 x (.06 - .65) x .15	=	$-44
Total			$-100

3. Employment and Payrolls. The effect on employment would be determined by both the change in total sales volume and the change in the container mix. Based on employment and sales volume data from other studies, we estimate that a decline of one million equivalent 12-ounce containers

in the total sales volume would reduce employment by .92 man-years, and an increase of one million equivalent 12-ounce containers in the refillable bottle-share of total sales volume would increase employment of production workers by .20 man-years and warehouse labor by .15 man-years. Applying these ratios to the respective changes in total sales volume and in the refillable bottle share of the total mix, as shown in Table C-2, we calculated the impact for each case as follows:

Volume change = man-years per million equivalent 12-ounce units x change in total number of units.

Mix change = man-year differential per million equivalent 12-ounce units of refillable containers x change in percent refillable containers x total volume.

			Man-Years	Payroll at $13,000 per Man-Year (Millions)
Case I				
Volume change:	.92(4299 - 4299)	=	-0-	
Mix change:				
Production	.20(.25 - .06)4299	=	+163	
Warehouse	.15(.25 - .06)4299	=	+123	
			+286	$3.7
Case II				
Volume change:	.92(4084 - 4299)	=	-198	
Mix change:				
Production	.20(.45 - .06)4084	=	+318	
Warehouse	.15(.45 - .06)4084	=	+239	
			+359	$4.6

Case III			Man-Years	Payroll at $13,000 per Man-Year (Millions)
Volume change:	.92(3869 - 4299)	=	-396	
Mix change:				
Production	.20(.65 - .06)3869	=	+456	
Warehouse	.15(.65 - .06)3869	=	+342	
			+402	$5.2

4. Investments. From data in other studies, we estimate that a one million unit increase in the sales volume of 12-ounce refillable beer containers would require approximately $30,000 in additional investments. Applying this ratio to the change in refillable sales volume for each case, as shown in Table C-2, we calculated the impacts as follows:

Case I refillable volume:	1,075
Base-year refillable volume:	-258
	817 x .03 = $24 million
Case II refillable volume:	1,838
Base-year refillable volume:	-258
	1,580 x .03 = $48 million
Case III refillable volume:	2,515
Base-year refillable volume:	-258
	2,257 X .03 = $68 million

5. Net Profits Before Taxes. Components of the impact on net profits are as follows:

a. Income effect of decline in sales volume = change in sales volume (millions of dollars) x ratio of operating income to sales.

Case I $ -16 x .17 = $ 2.7 million

Case II $ -59 x .17 = $10.0 million

Case III $-100 x .17 = $17.0 million

b. Increased labor costs = number of additional warehouse employees x average employment cost per man-year.

Case I 123 x $13,000 = $ 1.6 million

Case II 239 x $13,000 = $ 3.1 million

Case III 342 x $13,000 = $ 4.4 million

c. Increase in other costs = new capital investment x ratio of expenses (interest, depreciation, property taxes, insurance and utilities) to investment amount.

Case I $24 x .20 = $ 4.8 million

Case II $48 x .20 = $ 9.6 million

Case III $68 x .20 = $13.6 million

SECTION 3

CALIFORNIA BEER DISTRIBUTORS

1. Sales Value. The base-year sales value of $660 million was calculated by adding the average wholesaler's markup of 18 percent (as reported by the California Beer Wholesalers Association) to the sales value of $559 million at the brewery level.

Impact computation methodology was identical to that used for brewers. It takes into account the changes in sales volume, container mix, and the 15 percent price differential in favor of beer in nonreturnable containers.

Case I

Volume change: $660 x 0 -0-
Mix change: $660 x (.06 - .25) x .15 = $-19 million
$-19 million

Case II

Volume change: $660 x -.05 = $-33 million
Mix change: $660 x .95 x (.06 - .45) x .15 = $-37 million
$-70 million

Case III

Volume change: $660 x .-10 = $-66 million
Mix change: $660 x .90 x (.06 - .65) x .15 = $-52 million
$-118 million

2. Employment and Payrolls. The same methodology used for the brewers is also used here. From comparative employment, sales volume and mix data, we calculated the following ratios expressing the change in employment to change in total volume and change in volume of refillable containers.

Volume ratio: 1.05

Mix ratio: .40

Applying these ratios to the respective changes in total volume and in container mix (shown in Table C-2), we calculated the impact for each case as follows:

			Man-Years	Payroll at $12,000 per Man-Year (Millions)
Case I				
Volume change:	1.05(4299 - 4299)	=	-0-	
Mix change:	.40(.25 -.06)4299	=	+327	
			+327	$+3.9
Case II				
Volume change:	1.05(4084 - 4299)	=	-226	
Mix change:	.40(.45 - .06)4084	=	+637	
			+411	$+4.9
Case III				
Volume change:	1.05(3869 - 4299)	=	-452	
Mix change:	.40(.65 - .06)3869	=	+913	
			+461	$+5.5

3. Investments. The effect on investments would be primarily determined by the change in refillable bottle volume. From data in the ADS and New York studies, we estimate that each one million unit (12-ounce containers) increase in the refillable bottle sales-volume would require an additional $4,000 in capital investments. Applying this ratio to the changes in refillable sales volume for each case (as shown in Table C-2), we calculated the impact as follows:

Case I refillable volume: 1,075

Base-year refillable volume: -258

817 x .004 = $+3.3 million

Case II refillable volume: 1,838

Base-year refillable volume: -258

1,580 x .004 = $+6.3 million

Case III refillable volume: 2,515

Base-year refillable volume: -258

2,257 x .004 = $+9.0 million

4. Net Profits Before Taxes. Components of the impact on net profits before taxes are as follows:

a. Income effect of decline in sales volume.

Case I $ -19 x .05 = $1.0 million

Case II $ -70 x .05 = $3.5 million

Case III $-118 x .05 = $5.9 million

b. Increased labor costs due to mix change.

Case I 327 x $12,000 = $3.9 million

Case II 637 x $12,000 = $7.6 million

Case III 913 x $12,000 = $11.0 million

c. Other costs related to new investments.

Case I $3.3 x .20 = $ .7 million

Case II $6.3 x .20 = $1.3 million

Case III $9.0 x .20 = $1.8 million

SECTION 4

GLASS BOTTLE MANUFACTURERS

1. Sales Volume. This impact is calculated from the sales volume data shown in Table C-3. The total number of refillable bottles in each case has been adjusted to reflect the assumed trippage (the number of refills for each refillable bottle) of 10 for both soft drinks and beer. The results are summarized in Table C-3.

TABLE C-3

ESTIMATED IMPACT OF ASSEMBLY BILL 594
ON BEVERAGE BOTTLE SALES VOLUME
(In Millions of 12-Ounce Bottles)

	Base-Year			Case I		
Type of Bottle	Soft Drinks	Beer	Total	Soft Drinks	Beer	Total
Refillable	161	26	187	272	108	380
Nonrefillable	832	946	1,778	494	860	1,354
Total Bottles			1,965			1,734
Impact						-231

	Case II			Case III		
Type of Bottle	Soft Drinks	Beer	Total	Soft Drinks	Beer	Total
Refillable	328	184	512	376	252	628
Nonrefillable	234	613	847	0	387	387
Total Bottles			1,359			1,015
Impact			-606			-950

2. Sales Value. Sales values per unit were derived from base-year data furnished by the Glass Containers Manufacturers, and the change in total sales dollars calculated as follows:

Case I

		(Millions)
Soft Drink-Refillable	(272 - 161) x .0767	= $ +8.5
Soft Drink-Nonrefillable	(494 - 832) x .0399	= $-13.5
Beer-Refillable	(108 - 26) x .0510	= $ +4.2
Beer-Nonrefillable	(860 - 946) x .0375	= $ -3.2
		$ -4.0

Case II

Soft Drink-Refillable	(328 - 161) x .0767	= $+12.8
Soft Drink-Nonrefillable	(234 - 832) x .0399	= $-23.9
Beer-Refillable	(184 - 26) x .0510	= $ +8.1
Beer-Nonrefillable	(613 - 946) x .0375	= $-12.5
		$-15.5

Case III

Soft Drink-Refillable	(376 - 161) x .0767	= $+16.5
Soft Drink-Nonrefillable	(0 - 832) x .0399	= $-33.2
Beer-Refillable	(252 - 26) x .0510	= $+11.5
Beer-Nonrefillable	(387 - 946) x .0375	= $-20.9
		$-26.1

3. Employment and Payrolls. From actual base-year data provided by the California bottle manufacturers, we calculated that a change of one million equivalent 12-ounce bottles in the total sales volume would require the following man-years of employment, by type of bottle:

	Soft Drinks	Beer
Refillable	2.62 man-years	1.69 man-years
Nonrefillable	1.45 man-years	1.41 man-years

Applying these factors to the volume changes in the respective types of bottle (from Table C-3), we estimate the change in employment as follows:

		Man-Years	Payroll at $12,000 per Man-Year (Millions)
Case I			
Soft Drink-Refillable	(272 - 161) x 2.62 =	+290	
Soft Drink-Nonrefillable	(494 - 832) x 1.45 =	-490	
Beer-Refillable	(108 - 26) x 1.69 =	+139	
Beer-Nonrefillable	(860 - 946) x 1.41 =	-121	
		-182	$-2.2
Case II			
Soft Drink-Refillable	(328 - 161) x 2.62 =	+437	
Soft Drink-Nonrefillable	(234 - 832) x 1.45 =	-867	
Beer-Refillable	(184 - 26) x 1.69 =	+267	
Beer-Nonrefillable	(613 - 946) x 1.41 =	-469	
		-632	$-7.6
Case III			
Soft Drink-Refillable	(376 - 161) x 2.62 =	+563	
Soft Drink-Nonrefillable	(0 - 832) x 1.45 =	-1206	
Beer-Refillable	(252 - 26) x 1.69 =	+382	
Beer-Nonrefillable	(387 - 946) x 1.41 =	-788	
		-1049	$-12.6

4. Investment. From the data provided by the California glass container industry, we calculated that production of an additional volume of one million 12-ounce refillable bottles would require $12,000 in new investments. This ratio was applied to the estimated changes in the volume of refillable bottles for each case (from Table C-3).

Case I (380 - 187) x .012 = $2.3 million

Case II (512 - 187) x .012 = $3.9 million

Case III (628 - 187) x .012 = $5.3 million

5. Net Profits Before Taxes. This impact was estimated by applying the average net operating income margin of 15 percent, reported by Standard and Poor's, to our estimated change in sales value, and calculating additional overhead expenses at 20 percent of new investment.

(a) Sales volume effect:

Case I $-4.0 x .15 = $- .6 million

Case II $-15.5 x .15 = $-2.3 million

Case III $-26.1 x .15 = $-3.9 million

(b) Other expenses:

Case I $2.3 x .20 = $ .5 million

Case II $3.9 x .20 = $ .8 million

Case III $5.3 x .20 = $ 1.1 million

SECTION 5

CAN MANUFACTURERS

1. Sales Volume. The effect on beer and soft drink can sales volume and container mix, are shown in Table C-4, in Section 6.

2. Sales Value. From base-year sales data provided by the California can industry, we calculated the average value of $.067 per can. Applying this average value to the changes in volume, we estimated the sales value-impact as follows:

a. Case I (4093 - 5851) x .067 = $-118 million

b. Case II (2803 - 5851) x .067 = $-204 million

c. Case III (1630 - 5851) x .067 = $-283 million

3. Employment and Payroll. From data supplied by the steel and aluminum can manufacturers in California and data from other studies, we estimated that a reduction of one million 12-ounce units in total can sales would reduce employment in the can manufacturing industry by .90 man-years. Applying this ratio to the changes in the total can sales-volume, as shown in Table C-4, we calculated the impact for each case:

			Man-Years	Payroll at $12,000 per Man-Years (Millions)
Case I	(4093 - 5851) x .90	=	-1582	$-19.0
Case II	(2803 - 5851) x .90	=	-2743	$-32.9
Case III	(1630 - 5851) x .90	=	-3799	$-45.6

4. Impact on Net Profits Before Taxes. Standard and Poor's reported net operating income for the can manufacturing industries at 12.5 percent of

gross sales. Applying this margin to our estimates for impact on sales value, as shown above, we calculated the impact on profits as follows:

Case I

$-118 x .125 = $-14.8 million

$-204 x .125 = $-25.5 million

$-283 x .125 = $-35.4 million

SECTION 6

CALIFORNIA RETAILERS

1. Sales Volume. The impact on the soft drink and beer sales volume, based on the estimated changes in the total sales volume and container mix, are summarized in Table C-4.

2. Impact on Sales Value. According to the industry estimates, retail sales of soft drinks amounted to $907 million in 1974. The retail value of beer sold both in the "on premise" and "home consumption" markets is estimated at $838 million, using the average retail markup of 27 percent. From these base-year figures we calculate the impact using the estimated change in sales volume and container mix and taking into consideration the 25 percent and 15 percent price differentials on refillable bottles vs. nonrefillable containers.

Volume change = base-year sales volume (millions of dollars) x percent volume change/100.

Mix change = base-year sales volume (millions of dollars) x (100 - percent volume change/100) x change in percent refillable bottles/100 x percent price differential/100.

Soft drink sales value impacts:

Case I

Volume change: $907 x (-.05) = $-45 million

Mix change: $907 x .95 x (.31 - .55) x .25 = $-52 million

$-97 million

Case II

Volume change: $907 x (.10) = $ -91 million
Mix change: $907 x .90 x (.31 - .70) x .25 = $ -80 million
$-171 million

Case III

Volume change: $907 x (-.15) = $-136 million
Mix change: $907 x .85 x (.31 -.85) x .25 = $-104 million
$-240 million

Beer sales volume impacts:

Case I

Volume change: $838 x 0 = $ -0-
Mix change: $838 x (.25 - .06) x .15 = $ -24 million

Case II

Volume change: $838 x .05 $ -42 million
Mix change: $838 x .95 x (.45 - .06) x .15 = $ -47 million
$ -89 million

Case III

Volume change: $838 x .10 = $ -84 million
Mix change: $838 x .90 x (.65 - .06) x .15 = $ -67 million
$-151 million

Summary of sales value impact (millions):

	Case I	Case II	Case III
Soft drinks	$ -97	$-171	$-240
Beer	-24	-89	-151
Total Impact	$-121	$-260	$-391

TABLE C-4

ESTIMATED CHANGES IN PACKAGED SOFT DRINK AND BEER SALES VOLUME
(In Millions of 12-Ounce Containers)

	Base-Year			Impact Year								
				Case I			Case II			Case III		
Container-Type	Soft Drink	Beer	Total	Soft Drink	Beer	Total	Soft Drink	Beer	Total	Soft Drink	Beer	Total
Refillable Bottles	1,612	258	1,870	2,717	1,075	3,792	3,276	1,838	5,114	3,757	2,515	6,272
Nonrefillable Bottles	832	946	1,778	494	860	1,354	234	613	847	-0-	387	387
Cans	2,756	3,095	5,851	1,729	2,364	4,093	1,170	1,633	2,803	663	967	1,630
Totals	5,200	4,299	9,499	4,940	4,299	9,239	4,680	4,084	8,764	4,420	3,869	8,289
Percent Change from Base-Year				-5%	-0-	-3%	-10%	-5%	-8%	-15%	-10%	-13%

3. Employment Impact. The ratio of the change in employment associated with the change in sales of returnable bottles is estimated to be .60 man-years/million 12-ounce returnable containers.

We applied this ratio to the changes in sales volume of returnable bottles (as shown in Table C-4). It is assumed that the change in sales volume of other containers would have no measurable impact on retail employment.

	Man-Years	Payroll at $8,000 per Man-Year (Millions)
Case I		
.60 [(2,717 - 1,612) + (1,075 - 258)] =	1,153	$9.2
Case II		
.60 [(3,276 - 1,612) + (1,838 - 258)] =	1,946	$15.6
Case III		
.60 [(3,757 - 1,612) + (2,515 - 258)] =	2,641	$21.1

4. Investments. Investments would be required by the change in refillable bottles sales volume. From data in the New York study, we estimated that each one million unit increase in beer and soft drink sales volume would require an additional $1,000 in capital investments. We applied this ratio to the change in the refillable beer and soft drink sales volume for each case (from Table C-4) to calculate the impact.

Case I

$$.001 \left[(2{,}717 - 1{,}612) + (1{,}075 - 258)\right] = \$1.9 \text{ million}$$

Case II

$$.001 \left[(3{,}276 - 1{,}612) + (1{,}838 - 258)\right] = \$3.2 \text{ million}$$

Case III

$$.001 \left[(3{,}757 - 1{,}612) + (2{,}515 - 258)\right] = \$4.4 \text{ million}$$

5. Net Profits Before Taxes. The effect of (a) lower sales volume, (b) higher labor costs, and (c) additional overhead expenses associated with new facilities is estimated as follows:

(a) Effect of lower sales volume (based on average percent operating income reported by Standard & Poor's).

Case I $-121 x .035 = $ 4.2 million

Case II $-260 x .035 = $ 9.1 million

Case III $-391 x .035 = $13.7 million

(b) The effect on net income of increased labor costs is equal to the added payrolls, as calculated above under (3).

(c) Other expenses are estimated to be 20 percent annually of the amount of new capital investment.

Case I $1.9 x .20 = $0.4 million

Case II $3.2 x .20 = $0.6 million

Case III $4.4 x .20 = $0.9 million

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